Copy 2

CONTINUATION OF THE
BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB

The Auk

A Quarterly Journal of Ornithology

Vol. 59 JANUARY, 1942 No. 1

PUBLISHED BY

The American Ornithologists' Union

LANCASTER, PA.

Entered as second-class mail matter in the Post Office at Lancaster, Pa.

Accepted for mailing at special rate of postage provided for in the Act of October 3, 1917, embodied in paragraph 4, section 538, P. L. and R., authorized May 15, 1920.

CONTENTS

BIRDS OF THE GOMEZ FARIAS REGION, SOUTHWESTERN TAMAULIPAS. By *George Miksch Sutton* and *Olin Sewall Pettingill, Jr.* (Plates 1–6)..... 1

BIRDS OF THE GREAT SALT LAKE ISLANDS. By *William H. Marshall* and *Lyndon J. Leatham* 35

MIGRATION IN PACIFIC COAST WHITE-CROWNED SPARROWS. By *Barbara D. Blanchard* 47

MOURNING DOVE PRODUCTION IN SOUTHWESTERN IOWA. By *H. Elliott McClure* 64

SWAINSON'S WARBLER IN NICHOLAS COUNTY, WEST VIRGINIA. By *Maurice Brooks* and *William C. Legg*..... 76

A WESTERN RACE OF THE TOOTH-BILLED TANAGER. By *A. J. van Rossem*..... 87

A REVIEW OF THE SPECIES *Anas castanea*. By *S. Dillon Ripley*..... 90

GENERAL NOTES 100

RECENT LITERATURE 122

NOTES AND NEWS 139

OBITUARIES: Walter Willis Granger, 140; Alexander Hamilton Phillips, 140; Ira Eugene Cutler, 141; James Chase Hambleton, 141; Edwin Clark Kent, 142; Mrs. Mary Harriman Rumsey, 142.

THE FIFTY-NINTH STATED MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION. By *Lawrence E. Hicks*..... 143

FINANCIAL REPORT OF THE TREASURER FOR THE YEAR ENDED SEPTEMBER 30, 1941. By *Rudyerd Boulton*..... 153

MEXICAN MASKED TITYRA, MALE

From a painting in water-color made in the field by George Miksch Sutton. The tree is Tabebuia pentaphylla *in full flower.*

(one-fourth life size)

THE AUK

A QUARTERLY JOURNAL OF

ORNITHOLOGY

VOL. 59 JANUARY, 1942 No. 1

BIRDS OF THE GOMEZ FARIAS REGION, SOUTHWESTERN TAMAULIPAS

BY GEORGE MIKSCH SUTTON AND OLIN SEWALL PETTINGILL, JR.

Plates 1–6

THE senior author first visited southwestern Tamaulipas in the spring of 1938 when, as a member of that year's John B. Semple Expedition, he participated in a cursory survey of the bird life of the Rancho Rinconada, a partly cultivated stretch of flood-plain on the east bank of the Rio Sabinas, not far from the hill village of Gomez Farias (see Sutton and Burleigh, 1939). So impressed was he with the tropical aspect of the region, so puzzled by the dissimilarities between it and that of Victoria, only fifty miles to the north, and so convinced that what he had seen was but a faint indication of what might be discovered, that he resolved to return, as soon as possible, to undertake a thoroughgoing study of the breeding birds.

Opportunity came in the spring of 1941. He and the junior author, co-leaders of the Cornell University-Carleton College Ornithological Expedition, wishing to establish headquarters at a place where original work could be done, decided upon the Rancho Rinconada. Here, at an elevation of about 500 feet, they and their assistants, Dwain W. Warner and Robert B. Lea, resided from March 12 to May 4. Their abode was only a hundred yards or so from the Rio Sabinas. West of them rose a steep, well-forested foothill, which they called 'the mountain.' Beyond this towered the lofty Sierra Madre Oriental. The four-man party worked the nearer slope of their mountain thoroughly, thrashing about a good deal in the tangled vegetation half to three-quarters of the way to the top. Weekly trips for mail and provisions were made to Mante, about twenty

miles to the south. Warner made one trip to a mesa six or seven miles north of the Rancho and, on one occasion, attempted to reach the headwaters of the Rio Frio. Lea visited Gomez Farias once. The area most frequently traversed was, however, that extending three or four miles upstream and downstream from the Rancho itself. All this was, of course, low country.

The vegetation and the animal life they found to be distinctly tropical; many of the identified forms were characteristic of, though not necessarily restricted to, the Veracruzian Biotic Province as defined by Smith (1940: 101). Among the common trees were the bald cypress (*Taxodium mucronatum*), *higuerón* or strangling fig (*Ficus cotinifolia*), ear-tree (*Enterolobium cyclocarpum*), *palo de rosa* (*Tabebuia pentaphylla*), false ebony (*Pithecolobium dulce*), and such thorny or scrubby trees as the mesquite (*Prosopis*), and various *Cassias, Leucaenas,* and *Acacias.* The *pata de vaca,* or cow-hoof plant (*Bauhinia mexicana*) and the shrubby nightshade (*Solanum verbascifolium*) were common. In the low country, as well as on the mountainside, grew extensive stands of *huipilla* or wild pineapple (*Bromelia pinguin*) and tangles of *Smilax subpubescens.* The showy flower-sprays of the verbenaceous climbing purple-wreath (*Petrea arborea*) were a familiar sight. Bamboo grew in profusion along the river. In well-shaded places black-spotted orchids (probably *Oncidium* sp.) flowered. Throughout the more open woodland brightly colored epiphytes, many of them of the genus *Tillandsia,* flourished. To the branches of certain willows, mesquites, and other thinly leaved trees clung great clumps of an orange-berried mistletoe, *Phoradendron tamaulipense.*

Heliconiid butterflies were abundant. At least one species of the nymphalid genus *Morpho* was frequently seen. Scorpions were something of a pest about the house. Ticks swarmed, especially where cattle ranged, the adult stage being known as the *garrapata,* the young as the *pinolilla.* Tarantulas seen in certain caves were not especially large. Turtles and garpike were common in the river. Snakes were uncommon—a slender green species was seen once or twice and a coral snake (*Micrurus fulvius tenere*) was captured. Of the lizards collected—*Ctenosaura acanthura, Anolis sericeus, Sceloporus variabilis variabilis* and *Cnemidophorus gularis*—the first three are considered by Dr. Hobart M. Smith to be neotropical in distribution, the last nearctic. At least one member of the tropical genus *Iguana* also was seen. A barking frog, probably of the genus *Eleutherodactylus,* was vociferous during rains, but no specimen was captured.

Among the mammals were the jaguar (*Felis onca*) and the ocelot (*Felis pardalis*), as well as peccaries, white-tailed deer, opossums, armadillos, and various well-known rodents and smaller carnivores whose ranges extend northward into the United States. One exclusively tropical form that was frequently encountered was the *tejón* or coatimondi (*Nasua narica*). Close study of the mammalian fauna would doubtless disclose the presence of several other comparably Central American genera and species.

Among the birds four distinctly tropical families were represented—the Boat-billed Herons, or Cochleariidae; Potoos, or Nyctibiidae; Ant-birds, or Formicariidae; and Pepper-shrikes, or Cyclarhidae; as well as the following distinctly tropical genera: *Crypturellus, Cairina, Spizaëtus, Geranospiza, Micrastur, Herpetotheres, Crax, Penelope, Dactylortyx, Ara, Aratinga, Amazona, Piaya, Anthracothorax, Scapaneus, Veniliornis, Tityra, Megarynchus, Myiozetetes, Amblycercus, Saltator,* and *Volatinia.* It is the authors' belief that most of the above-named groups reach about their northern limit of range in the Gomez Farias region, for only about half of them are found in the vicinity of Victoria, fifty miles to the north, just above the Tropic of Cancer; three or four—such as *Ara, Aratinga,* and *Amazona*—are seen occasionally as far north as Linares, Nuevo Leon, at about latitude 25° N.; a few (*Ara, Amazona, Piaya,* etc.) are found in Sonora, considerably to the northwestward (see van Rossem, 1931); and none is found (save perhaps as a straggler) as far north as Matamoros, at the mouth of the Rio Grande.

On and about the Rancho there were five principal plant associations or, to use a vernacular phrase, five 'sorts of country': (1) scrubby, somewhat xerophytic thicket, loosely termed *huisache,* back from the river a way, occupying flat, uncleared areas such as that between the Rancho and the highway. Characteristic of this thick growth were various sennas (*Cassia*), crotons (*Croton*), a yellow-flowered vine of the Apocynaceae, *Traechelospermum* sp., thorn-bearing shrubs of the genera *Acacia* and *Leucaena,* such vines as the cat's claw and a yellow-flowered *Bignonia,* or trumpet-vine, and the savagely barbed *huipilla,* or wild pineapple, *Bromelia.* (2) Cypress timber, invariably near the river, but sometimes extending back from the water a hundred yards or more. Here grew other large trees, some of them so umbrageous that little in the way of plant life lived under them, and tough native bamboo. One characteristic plant was the scandent shrub *Petrea.* (3) Heavy woodland not near the river; this sort of forest (without any cypress) was to be found principally on the mountainside southwest of the Rancho. Several species of

drupe-bearing trees throve where the soil was good. Beneath these grew shrubbery of an open sort. Where there was little soil, *huipilla* thickets and vine-tangles flourished. (4) Palmetto forest. There were scattered palmettos (*Sabal* sp.) on the Rancho, but no area where that type of vegetation dominated, as it did in certain extensive stretches along the highway farther south. (5) Farmlands. Cleared areas were responsible for the presence of many species of birds. About the Rancho the tilled sections were given over to corn, oranges, sugar cane, Napier grass, and various vegetables. Grazing areas were only partly cleared. The cultivated acreage about El Limon and Mante was extensive.

The authors were disappointed in finding no marshes near the Rancho. The banks of the Sabinas were clear-cut and drainage was thorough. Along the highway rainwater pools formed, but these came and went before aquatic plants could establish themselves. The river rose considerably after heavy rains in late April and early May, but no flood-pools formed.

As for the climate—the Rancho will long be remembered for its wet, misty, cloud-hung weather. Bright, sunny days were enjoyed March 20 and 25, from March 30 to April 10, and April 21, April 29, and May 2. The rest of the period was described (in various notebooks) as 'gray,' 'dirty,' 'drizzly,' 'mean,' 'ugly,' and so forth. The season was not supposed to be rainy, but rain fell. Most of this was light, at any rate not heavy enough to cause the river to rise and fall; but on April 30 a three-day rain started which washed the 'bridge' out, dug away the road across the arroyo between the Rancho and the highway, prevented observation of all nests on the opposite side of the river, and threatened general flood.

Not all the Rancho's gray days furnished a correct index to general weather conditions. This was proved repeatedly on the authors' weekly trips to Mante. Now, looking 'homeward' from the highway, they could see a cloud covering the very mountainside where they had hunted quail morning after morning. The weather, in other words, was good, but at the Rancho there was no means of knowing this because the cloud was so low and dense. That this cloud has influenced the plant-life and therefore the birds there can be little doubt. Certain of the more tropical species may exist in the Gomez Farias region primarily or *only* because this cloud so retards the rate of evaporation as to make the luxuriant growth of certain food-bearing or shelter-affording plants possible.

The low parts of southwestern Tamaulipas lie within what has traditionally been called the *tierra caliente,* or 'hot land,' of Mexico,

NEST OF MEXICAN CURASSOW

MALE MEXICAN CURASSOW

throughout which thermal region the average annual temperature is between 70 and 75 degrees F. Along the Sabinas the mean annual rainfall is said to be 30 to 40 inches; the period from November 1 to April 30 is relatively dry, 70 to 80 per cent of the rain falls from May to October, and the heaviest precipitation takes place in June, when, according to isohyet maps in Bartholomew's 'Physical Atlas' (1899, vol. 3, Meteorology) over 16 inches of rain falls. According to isoneph maps in the same work, southwestern Tamaulipas is more or less shaded by clouds most of the year, September and October being the brightest months. The Gomez Farias cloud above described is, however, more in the nature of a local cloud-banner, caused by the sudden cooling to the dewpoint of warm air that rises from the Sabinas valley. It clings to the foothills especially during hot weather, its position changing little from day to day because the wind is almost invariably from the east.

The Gomez Farias region lies within what Pope has denominated the 'northern Gulf Coast' temperature province of Mexico, but since statements pertaining to this province appear to be based on records kept at very few points (Monterrey and Tampico, principally), it is feared that they may not very accurately apply to *southwestern* Tamaulipas (see Page, 1929). The authors noted that the temperature at the Rancho varied greatly with the coming and going of the sun. On bright days it was very hot between 10.30 a.m. and 4.30 p. m., when relief came because the sierra to the west cut off the fierce rays. The night of March 13 was so cool that all available bedding was used. On the whole the nights were warm.

Most of the bird species encountered were sedentary, some of them (the tinamous, for example) decidedly so. Certain supposedly permanent-resident forms were, on the other hand, found to be migratory. That is to say, they were not in evidence when the expedition began its work but put in their appearance as spring advanced. Among these were *Saltator atriceps, Myiodynastes luteiventris, Myiarchus tyrannulus nelsoni,* and *Vireo olivaceus flavoviridis.* Several species were winter visitants, among them *Dumetella carolinensis, Empidonax minimus,* and *Sayornis phoebe.* Other United States species, noted principally in late April and May, were transients en route northward from their winter home in Central or South America.

All but seven of the species and subspecies listed below were recorded by the Cornell University-Carleton College Expedition in 1941. The seven not recorded by them—*Geranospiza nigra, Pionus senilis, Empidonax flaviventris, Empidonax wrighti, Melanotis caerulescens, Hylocichla ustulata,* and *Piranga leucoptera*—were taken by the

Semple Expedition three years previously or by Warner during the midsummer of 1941. The taxonomic work on the 1941 collection was done by the senior author, who alone must be held responsible for errors. The order and nomenclature of the first part of the list (through the swifts) follow those of James L. Peters's 'Check-list of Birds of the World,' vols. 1–4. Virtually all 1941 specimens referred to are now at Cornell University.

For assistance in the preparation of this paper the authors are indebted to staff members of the American Museum of Natural History; the Museum of Zoology at the University of Michigan; the U. S. National Museum and Fish and Wildlife Service of the U. S. Department of the Interior; and the Field Museum of Natural History. They are especially grateful to Mr. J. L. Peters of the Museum of Comparative Zoölogy at Harvard, for identifying the swifts, potoos, wood owls, and Yellow Warblers; to Mr. Adriaan J. van Rossem, of Los Angeles, for identifying the Bat Falcons; to Dr. Alden H. Miller, of the Museum of Vertebrate Zoology at the University of California, for identifying the Lincoln's Sparrows; to Mr. Robert T. Moore, of Pasadena, for his great courtesy in sending East the type and his one other specimen of *Otus guatemalae fuscus;* to Mr. Boardman H. Conover, of Chicago, for lending certain quail specimens; to Dean Liberty H. Bailey and Dr. Robert T. Clausen, of Cornell University, for identifying plants; to Dr. Paul C. Standley, of the Field Museum, for editing all paragraphs pertaining to botanical matters; to Mr. Allan R. Phillips, now majoring with the senior author at Cornell, for his expression of opinion concerning certain *Ammodramus, Empidonax,* and *Piranga* specimens; and to Dr. Hobart Smith, of the University of Rochester, for identifying several reptiles.

They also wish to thank Mr. John B. Semple, of Sewickley, Pennsylvania, for ammunition; Dr. Norman G. Moore, of Ithaca, New York, for medicine and counsel; the officials of the Forestry and Game Branch of Mexico's Department of Agriculture, for issuing scientific collecting permits; and Miss Marion Patton and Mrs. M. N. Beebe for secretarial help.

LIST OF SPECIES

MEXICAN TINAMOU or *Perdiz, Crypturellus cinnamomeus mexicanus.*—Common in wild-pineapple thickets and less dense woodland at river-level as well as on mountain up to possibly 1500 feet. Heard almost constantly, though infrequently seen. Began whistling early, 3.45 to 4 a. m., save when the wind was high or the rain heavy. Sang throughout the hottest days, often until well after dark. During early April when the moon was full and the nights were clear its mellow

whee-oo-ee sounded at all hours. Night-singing birds did not walk about, and their whistling lacked ebullience.

Whether both males and females whistle we cannot say. Certainly it is possible to call males up by whistling, for we did so repeatedly. They approached us stealthily, craning their necks. Their whistling was accompanied by a swelling of the throat and jerking of the head. Frequently, while waiting for such birds to appear, we would hear a muffled beating of wings. It is our belief that this *drumming* was a regular part of the courtship.

Several male specimens (no females) were taken March 22–April 30. In all these the testes were greatly enlarged (about 20 × 35 mm.), so egg-laying probably was going on during our entire stay. April 20, we learned that a nest with three eggs had been found "at the foot of a tree on the mountain," but when we asked to be led to the spot we were told that the young had already hatched and run away.

The birds were exceedingly sedentary. We could count on finding certain individuals resting or feeding in certain places at any time of day. The sound of our footfalls often incited them to whistling. In every crop or stomach examined we found whole or partly digested seeds of the *huipilla* (*Bromelia*).

April 9, Warner whistled a tinamou up to within a few feet. Curious as to what the bewildered creature would do, he struck a fence wire sharply with his gun. The bird crouched *with wings spread.* He struck the wire again and the bird whirred up noisily, making straight off through the forest.

Our series of specimens exhibits considerable variation as to back-color and buffy tipping and barring of the tertials and wing coverts. The more heavily marked individuals may be younger birds.

PIED-BILLED GREBE, *Podilymbus podiceps.*—Noted at two places: at a roadside pond south of Mante, a single bird, March 12; and along the Rio Sabinas, not far from the Rancho, a single bird, daily from March 18 to 30.

WHITE PELICAN, *Pelecanus erythrorhynchos.*—Noted but once: a V-shaped flock of nine birds flying southeastward above the Rio Sabinas, April 15 (Lea).

OLIVACEOUS CORMORANT, *Phalacrocorax olivaceus.*—Noted daily along the Sabinas March 15–April 30. One or two birds regularly fished or sunned themselves not far from our swimming hole near the Rancho.

WATER-TURKEY, *Anhinga anhinga.*—Noted twice in 1941—a single bird April 9 and a single bird April 30, along the Sabinas. Noted by the senior author's party on March 3 in 1938 (Sutton and Burleigh, 1939: 24).

LITTLE BLUE HERON, *Florida caerulea.*—Noted daily along the Sabinas March 14–April 19: one in white plumage, with two Snowy Egrets, March 14–26; two in white plumage (with no egret), March 27–April 19. They fed extensively on Dobson-fly larvae which they caught in the shallows. Single bird in blue plumage seen March 22 (Lea).

AMERICAN EGRET, *Casmerodias albus egretta.*—Single bird noted along the Rio Sabinas, near the Rancho, March 25 and 26. Adult female, with long nuptial plumes, taken one mile south of El Limon, April 5 (Lea).

SNOWY HERON, *Leucophoyx thula.*—Two in nuptial plumage noted daily along the Rio Sabinas, March 14 to 26.

CABANIS'S TIGER BITTERN, *Heterocnus cabanisi.*—One or two noted daily along the Sabinas, March 17 to May 1. Fed in shadowy places at river's edge or in fields some distance back from the water. May 1 a nest was found on an almost horizontal branch fifty feet above the water in a huge, moss-hung cypress (Lea). Apparently the species is not colonial, for no other pairs were seen in that vicinity.

MEXICAN BOAT-BILLED HERON, *Cochlearius cochlearius zeledoni*.—Noted but once—an adult male (testes slightly enlarged) taken along the Sabinas near the Rancho, April 8 (Lea).

According to Peters (1931: 125), *C. c. zeledoni* ranges "from Sinaloa and Veracruz south to northern Costa Rica." We have knowledge of at least three Tamaulipas specimens aside from that mentioned above—two at the American Museum (taken May 21, 1888, at Tampico, by George B. Sennett); and one at the U. S. National Museum, taken by Frank B. Armstrong at Alta Mira, in November, 1894 (Richmond, 1896: 627). The British Museum Catalogue (1898: 26, 165) also lists a specimen of *'Cancroma zeledoni'* from Tampico. This is said to be a juvenal male taken by W. B. Richardson.

MUSCOVY DUCK, or *Pato Real, Cairina moschata*.—Noted daily along the river and in fields well back from the water. Seen frequently in trees. Fair-sized flocks encountered as late as April 14, pairs or single birds thereafter. Testes of two males taken by Warner, March 23, were greatly enlarged, but our Mexican friends assured us that nesting did not begin until much later in the season. We did not see a nest or young birds.

A courting male swam about the female wagging his tail, thrusting his head far forward and drawing it back slowly, uttering throaty grunts; or pursued her in flight, keeping close behind or to one side, calling amorously.

BLACK VULTURE or *Zopilote, Coragyps atratus*.—Abundant. At Mante, where scores of these scavengers fed regularly at the hotel's refuse cans, incoming and outgoing birds often flew into wires and clothes lines. So far as we could see they did not injure themselves.

March 19, an incubating bird was flushed from its nest in a *huipilla* thicket. It ran about in narrow circles, grunted once or twice, then flapped off noisily. While being watched from the blind March 23, it poked its two eggs roughly with its bill, turning them over, then abruptly fell forward on them. Bits of shell remained in the nest, March 30 (Lea).

TURKEY VULTURE, *Cathartes aura*.—Less common than the Black Vulture and less frequently seen in the towns. At the Rancho the former was so abundant we gave up counting it. Not so the latter. Rarely were more than three or four seen during the course of a day unless, along the highway, several chanced to gather about the carcass of a burro, pig or dog. Pettingill saw one come to drink at a certain spot along the river each evening, March 19 to 26.

WHITE-TAILED KITE, *Elanus leucurus*.—One or two birds noted March 31 to April 20 along the Sabinas. Noted once thereafter, a single bird circling above the village of Sante Ines, April 20 (Lea). Seen, as a rule, early in the morning or just before nightfall. One, watched for fifteen minutes at dusk on April 7, was hunting. It flew gracefully, treading the air with wings beating high above its back and tail pointed down, plunging swiftly earthward when it sighted prey.

PLUMBEOUS KITE, *Ictinia plumbea*.—Female with greatly swollen oviduct and male with somewhat enlarged testes taken respectively April 18 and 19, about half a mile downstream from the Rancho (Lea). These were almost certainly a mated pair. Peters (1931: 201) gives "southern Mexico" as the northern limit of this species' range. So far as we have been able to ascertain, it has not been recorded heretofore from Tamaulipas.

COOPER'S HAWK, *Accipiter cooperi*.—Noted near the Rancho daily March 31–April 3, a single bird (thought to be the same highly colored individual) each day.

SHARP-SHINNED HAWK, *Accipiter striatus*.—Noted occasionally along the Sabinas, in thickets rather than dense woodland, March 22 to April 8. All that were clearly seen were in immature plumage.

RED-TAILED HAWK, *Buteo jamaicensis*.—Identified with certainty only once in the Gomez Farias region—an adult, perched along the highway in open country a short distance north of El Limon, March 12.

SWAINSON'S HAWK, *Buteo swainsoni*.—Great flocks seen high in air March 25, 27, and 28 near Rancho; on April 1, near the Rio Frio; and April 3, two miles upstream from the Rancho. Small flock seen drifting northward, April 15. Loose flock flying just above treetops and five birds perched on dead tree near Rancho seen April 25. Two seen soaring over Rancho, April 30. Two seen soaring over El Limon, May 3. Female in 'normal' plumage taken by Lea from a large flock, April 3. Insect remains were found in the stomach.

GRAY-TAILED HAWK, *Buteo magnirostris griseocauda*.—Noted several times, March 12, along highway from Victoria to Mante. Several mated pairs observed daily along the Sabinas, March 14 to May 2. Some mated birds (thought to be actually nesting) were brown-eyed, though most were yellow-eyed. Adult female taken April 12, 1941 (Warner). The ovary in this specimen was not paired.

MEXICAN GOSHAWK, *Asturina nitida plagiata*.—Noted daily, March 14 to April 29, along the Sabinas, most birds seen being mated adults. Two gray-eyed subadult males (with gray feathers in back and gray-barred plumage on chest and belly) taken, respectively, April 15 and 21. Adult female taken March 30. Brown Jays mobbed *young* Mexican Goshawks on several occasions, but did not disturb the adults. In 1938, a pair were seen courting on March 3 (Sutton and Burleigh, 1939: 26).

RIDGWAY'S BLACK HAWK, *Hypomorphnus urubitinga ridgwayi*.—Clearly marked adult seen several times along the Sabinas, March 18. Identified by white upper tail-coverts, which were distinctly visible when bird flew. Probably seen on other occasions also, but not certainly identified. A mottled immature female, taken along the Sabinas by the senior author on March 2, 1938, was misidentified, being listed as *Buteogallus a. anthracinus* (Sutton and Burleigh, 1939: 26).

MEXICAN BLACK HAWK, *Buteogallus anthracinus*.—Dark-rumped black hawks noted along the Sabinas March 18 to April 8 were of this species, but no specimen was actually collected south of Güemes (near Victoria), where Sutton took an adult male, March 10. The 'immature female . . . taken March 2 along the Rio Sabinas' in 1938 (Sutton and Burleigh, 1939: 26) was actually an example of *Hypomorphnus urubitinga ridgwayi* (see above).

ORNATE HAWK-EAGLE, *Spizaëtus ornatus*.—Noted infrequently on mountain above the Rio Sabinas, March 19 to 27. Pair encountered March 19 acted as if they were on their nesting territory, for they kept up a thin, clear screaming and evinced more than casual interest in a certain dense part of the forest. The male, which was noticeably the smaller, was seen to carry about and eat some small mammal, probably a squirrel. Both birds held their crests erect most of the time.

Sutton collected the female that day. Stomach and crop were found to be empty; the ovary was paired but unenlarged. To a claw hung a green feather, probably that of a Red-crowned Parrot. March 21, one was seen to strike at, but miss, a quail (*Dactylortyx*) that was crouching at the edge of a rockside.

MARSH HAWK, *Circus cyaneus*.—Noted March 12 to April 24. On some days several individuals (recognizable from differences in plumage) were seen. About

one in every six was a gray adult male. Especially common about sugar-cane fields near Mante and El Limon. March 23, a brown individual that circled a field near the Rancho cackled vigorously.

April 1, Pettingill saw a Marsh Hawk chasing a Spotted Sandpiper down river. The hard-pressed sandpiper suddenly flew *into* the water, bewildering its pursuer, reappeared an instant later, and flew off. The hawk did not resume the chase.

BLACKISH CRANE HAWK, *Geranospiza nigra nigra*.—Not seen in 1941. In 1938, however, John B. Semple took an immature male along the Sabinas on March 1 (Sutton and Burleigh, 1939: 27).

OSPREY, *Pandion haliaëtus*.—Single bird seen flying over the Sabinas, March 20, March 24, and frequently from April 15 to 29.

LAUGHING FALCON, *Herpetotheres cachinnans*.—Noted but once: a fully adult bird, circling over the Rancho not very high in air, April 11.

LESSON'S COLLARED MICRASTUR, *Micrastur semitorquatus naso*.—Noted daily near the Rancho, usually in the early morning or at nightfall when, from some thicket near the river, its loud, half-human *ah-ow, ah-ow, ah-ow* would sound.

March 31, one was seen eating an Alta Mira Oriole. Again, on April 3, one was frightened from the ground where it had been feeding on a Chachalaca. Adult male taken April 1; immature male, with heavily barred under parts, taken April 13.

CARACARA, *Polyborus cheriway*.—Noted almost daily about the Rancho, though not common there. One or two came occasionally with the vultures to feed on garbage. Birds carrying food in their mouths seen April 2. Pair seen copulating April 3 (Warner).

BAT FALCON, *Falco albigularis*.—On April 5 a pair of Bat Falcons were encountered two miles down-river from the Rancho in precisely the spot where, on March 3, 1938, a breeding pair were taken by the senior author (Sutton and Burleigh, 1932: 27). Here Warner saw the female fly into a hole high in a dead tree and found feathers of many small birds, including rectrices of the Prevost's Mango, *Anthracothorax prevostii*, underneath the eyrie. The male was taken April 8, the female April 10. The oviduct of the latter was greatly swollen and there were distinct brood-patches on the belly.

All our specimens have been carefully identified by Mr. Adriaan J. van Rossem, who finds them to be intermediate between *F. a. albigularis* and *F. a. petrophilus*, the latter in size, close to the former in color.

SPARROW HAWK, *Falco sparverius*.—Noted daily, March 12 to April 4. Several seen in open country about Mante, March 12. One seen diving at pair of Mexican Goshawks, March 14. In a dead tree near the Rancho three birds perched almost constantly, March 15 to 25. Thereafter one bird a day was seen until April 4, when the species disappeared.

MEXICAN CURASSOW or *Faisano Real, Crax rubra*.—Seen and heard repeatedly in big timber half way up the mountain southwest of the Rancho. Males heard booming virtually every day, March 15 to April 14. This call, a deep, resonant *oomp*, best imitated in the throat with the lips closed, was nearly always given from some large tree in the depths of the forest. Though impressive, it did not carry far. More than once we were surprised at discovering booming birds directly overhead.

The neck-skin of a male taken March 15 was thick and flabby. The subcutaneous tissues were muscular, being supplied with a considerable network of blood vessels.

The gizzard lining was exceedingly tough and deeply corrugated. Large caeca were noted.

March 17, two nests were discovered on the mountain southwest of the Rancho. One of these (unoccupied) was made entirely of green leaves. It was flimsy, though supported by an ample crotch, and was about fifteen feet from the ground. The other was in a vine-covered clump of slender trees some distance farther up the mountain, and twenty feet from the ground. Here the female was incubating. From the slope we could see her dark tail and tousled crest.

When Pettingill and Lea returned for photographs, both parents protested volubly, scampering about on the ground, giving thin screams, peculiar grunts, and wails. There were two huge, white eggs (see Plate 2). These remained in the nest until the night of March 23, when they were destroyed by some predator. Unless agitated by our being near their nests or young, the birds kept high in the trees.

On two occasions (March 21 and April 14) Sutton came suddenly upon females that must have had young. One mother bird ran back and forth through the brush calling *kwut, kwut,* and giving a thin, penetrating squeal. The other flopped from a tree to the ground, spread and shook her tail, and limped away groaning loudly.

PURPLISH GUAN or *Ajol, Penelope purpurascens purpurascens.*—Fairly common in heavily wooded sections at river level as well as at greater elevations. One pair nested in the 'tropical corner'—a dense, tangled woodland at a bend of the Sabinas a quarter of a mile upstream from the Rancho.

Early in the morning and at nightfall mated birds frequently called to each other in plaintive *kelps* which could be heard a long way. From March 21 to the end of the month courtship antics were observed, especially in the deep woods half way up the mountain. Here the males sparred, threatening their rivals with harsh, throaty cackles; pursued each other through the tops of the big trees; and *drummed* by flying from perch to perch with wings beating rapidly. They were surprisingly nimble. Often they leaped from bough to bough without spreading their wings, or moved into a new tree with an easy glide. In *drumming* they flew slowly with wings beating furiously, sometimes moving upward, sometimes turning from side to side in mid-air, as if in a daze.

The birds fed almost exclusively on the ripe *xoxotl* plums (probably *Spondias mombin*) which at this season were abundant. This fruit they plucked directly from the branches. Not once did we see an adult Purplish Guan on or near the ground.

April 26, Pettingill and Lea came upon a downy young one in the 'tropical corner.' Though obviously only a few days old, it flew up from the ground, alighted on a branch, ran into a tangle of vines, and disappeared. Sutton was fortunate enough to find this (or another) young bird the following day. This time the little thing was fifty or sixty feet from the ground, running briskly along a naked limb. The parents, still higher in the trees, were giving a doleful outcry. Reaching the end of the branch, the baby flew lightly to another tree. Shooting it was difficult, for the branches hid it remarkably well. It was about the size of a Bob-white Quail, with long, thin neck. Though downy, its remiges were well developed, and its tail about 2¼ inches long. Above, it was rich chestnut mottled with buffy and black. The median part of the crown, nape, and hind neck was chestnut, bordered at either side with a band of black, a line of white,

then a dark area that faded into the white of the throat and neck-front. The chest and sides were reddish brown, the belly was white. The eyes were clear gray, the bare area about them olive, the feet reddish brown. In its crop were bits of tender leaves.

A male and a female were taken above the Sabinas on February 28, 1938, by the senior author (Sutton and Burleigh, 1939: 28).

CHACHALACA, *Ortalis vetula vetula*.—Abundant in thicketed parts of the low country and, where the forest was open or brushy, on mountains up to about 2000 feet. Nearly always seen (or heard) in companies of from four to six or seven, probably family groups. Called loudly before rains (especially thunderstorms) and sometimes, when the moon was bright, at night. Alarmed by the presence of some enemy it sometimes gave a harsh *churr, churr,* rather than the usual *cha-cha-lac.*

Groups of nests discovered by us in the *huisache* thickets indicated that this species may be somewhat colonial at times.

BOB-WHITE, *Colinus virginianus*.—Fairly common in open country on and about the Rancho. Pairs noted almost daily, March 18 to May 3. Heard only infrequently, presumably because there were few unmated males. April 24, a nest containing seven eggs was found in a field close by the house. Though weeds were cut leaving the nest exposed, the female laid two more eggs, deserting on the 27th.

Three adults taken (male and female, El Limon, March 29; male, Rancho, April 3) differ widely *inter se,* especially as regards the markings of the chest and belly. These, in turn, are different from two San Luis Potosí males (Valles and Matlapa), and quite unlike four topotypical *C. v. maculatus* from Alta Mira, Tamaulipas, in being gray rather than black-crowned and in being much more heavily spotted with black below. For the present we may call Gomez Farias birds intermediate between *texanus* and *maculatus.*

SINGING QUAIL, *Dactylortyx thoracicus thoracicus*.—The name 'Long-clawed Quail,' by which this species is sometimes known, is inadequate. The unforgettable thing about *Dactylortyx* is its song—a loud, rhythmical outburst that makes one think of a large wren, thrasher, or solitaire. We were puzzled by this 'singing bird of the mountain' literally for weeks. Since Sutton had seen *Dactylortyx* near the Rancho in 1938, he expected to obtain specimens. But not until Warner chanced to hear part of the song just as a quail flew up did any of us suspect that two of our 'mystery birds'—the quail that no one ever had a chance to shoot, and the 'singing bird' that no one ever saw—were one and the same species!

The birds inhabitated steep, thicketed slopes. With a pretty twittering they would burst from underfoot, to rocket off up, or down, or across the mountainside. Following them often meant climbing from ledge to ledge. We usually encountered them in pairs. The males might sing at any time of the day, but they seemed to prefer rainy or foggy mornings. Frequently they sang at nightfall. The song began uncertainly, with an experimental whistle. After a pause the whistle was repeated. Gaining strength, it came more rapidly, three times, four times, five times—full-throated, sure of itself, even defiant—then broke into a rollicking *pitch wheeler! pitch wheeler! pitch wheeler!* and trailed off with low twittering.

Pettingill took the first specimens—a breeding male and female with well-defined brood patch, April 11. April 16, Sutton collected a female and her brood of two newly hatched young. The circumstances were interesting. Making his way along a rocky ledge, he heard a quail near him. Suddenly a bird flew out,

BLACK VULTURE ON NEST

DOWNY YOUNG SINGING QUAIL

giving him no shot. Looking down he spied another bird crouched *not more than a yard* from his foot. Backing slowly, he eventually shot. Picking up the female bird he found two young ones, obviously just hatched. They were dark chestnut above, with a buffy line along either side of the rump, bright buffy superciliary area, dark line through the eye, red-brown bill, and somewhat clouded or mottled under parts (see Plate 3). He did not find the nest itself.

WILD TURKEY, *Meleagris gallopavo*.—On April 8, Warner and our Mexican campman, Maclovio Rodriguez, travelled by horseback to a mesa six or seven miles northeast of the Rancho. Here in clumps of trees that dotted the grassy tableland, they heard the gobbling of turkeys. A single turkey seen near the Rancho behaved like a wild bird, for it flew well, but it was thought to be partly domesticated.

WESTERN SOLITARY SANDPIPER, *Tringa solitaria cinnamomea*.—The Solitary Sandpiper was recorded twice along the Sabinas, a male taken April 9 (Pettingill) and a single bird seen April 27. Though without marbling on the inner web of the outermost primary, our specimen is too large for the eastern form, the wing measuring 137 mm., the culmen 29.5.

SPOTTED SANDPIPER, *Actitis macularia*.—Noted along the Sabinas March 14 to May 3, usually one or two, but occasionally as many as four birds each day. One was seen to escape from a Marsh Hawk by flying *into* the water, April 1 (Pettingill).

RED-BILLED PIGEON, *Columba flavirostris flavirostris*.—Noted daily, usually near the river. A flock (ten to thirty individuals) gathered near the Rancho each morning. After feeding and drinking they sat quietly in a clump of bamboo or on dead cypress branches. The usual call-note was a long-drawn-out *oooooh*, followed by the syllables *up-cup-a-coo*. The first sign of nest-building was noted March 18, a bird with a twig in its bill (Lea). Male with slightly enlarged testes taken April 21 (Warner).

EASTERN MOURNING DOVE, *Zenaidura macroura carolinensis*.—The Mourning Dove was noted throughout our stay, infrequently from March 12 to April 21, in great numbers thereafter. With the clearing of certain fields on April 20 and 21 large flocks (from one to two hundred birds) suddenly appeared. Though no nest was found, courtship behavior was noted on several occasions. A male taken by Warner, April 16, represents the eastern race (wing, 147 mm.; tail, 136).

EASTERN WHITE-WINGED DOVE, *Zenaida asiatica asiatica*.—Heard infrequently, April 5 to April 21. Seen first in the Rio Frio district where, on April 18, Warner took two males (testes 6×10.5 mm.). Became steadily more common near the Rancho after April 21. Noted as 'abundant' April 30. These dates probably indicate the progress of the species' spring migration.

The two above-mentioned males and a male taken at the Rancho April 27 (Lea) measure respectively, wing, 159, 156, 163 mm.; tail, 112, 111, and 106, and are, therefore, too small for the western race, *Z. a. mearnsi*. Furthermore, no bird of the three is pale enough for that subspecies.

INCA DOVE, *Scardafella inca*.—Fairly common about the Rancho buildings, where it was seen daily. March 30, a nest with two heavily incubated eggs was found in a small orange tree. The following day both the male and the female were seen sitting on this nest (Pettingill). The eggs hatched April 2. The young disappeared a few days thereafter, probably victims of a house cat.

May 2, two males were seen sparring over a female. The three birds sat close side by side on a twig, the female in the middle, with wings closed. The males,

fluttering, struggled with each other, locking bills, striking with their wings, and jumping on to and off the female repeatedly (Sutton and Lea).

GROUND DOVE, *Columbigallina passerina*.—Noted daily. Commoner in open country in the vicinity of El Limon and Mante than along the Sabinas. A few pairs nested in the cleared area around the Rancho buildings. Here a nest with one egg was found March 26.

BLUE GROUND DOVE, *Claravis pretiosa*.—Identified with certainty but once—a male, flushed from the roadway between the Rancho buildings and the highway and *very clearly seen*, April 1 (Sutton and Warner).

WHITE-FRONTED DOVE, *Leptotila verreauxi angelica*.—Seen and heard daily in brushy woodland at river-level as well as on the mountain up to about 2000 feet. Most birds seen were flushed from the ground in thickets. Alighting, they expressed curiosity or alarm by lifting their tails and bobbing their heads. Several nests were found, those on the mountainside invariably among boulders, those at river-level near the ground, in trees or vines. Two sets of eggs discovered March 29 were heavily incubated. One of these sets hatched the following day. Nest with fresh eggs found April 15.

A male taken April 23 is a trifle more vinaceous on the chest than Texas examples of *angelica* at hand, but the under tail-coverts are only slightly washed with buffy along the edges, and the middle of the belly is almost pure white.

EASTERN MEXICAN MILITARY MACAW, *Ara militaris mexicana*.—Noted almost daily. Pairs, or flocks of up to sixty individuals, flew over the Rancho mornings and evenings, occasionally alighting close by. They usually flew abreast, their squawks being audible a mile or more on calm days. They fed on various fruits and seeds, and were considered a pest by the farmers. According to our camp-man, they nest in August.

Two males (testes slightly enlarged) were obtained: March 27; April 27. The latter was molting extensively, the longest rectrices being broken at the tip. In the perfect specimen the tail measures 408 mm.

GREEN PARAKEET, *Aratinga holochlora holochlora*.—Seen daily, fluctuating in abundance with the food supply. Usually flew high in air, racing back and forth above the wooded mountainside, shrieking noisily. From April 15 on, most flocks were composed of mated birds. April 30, Sutton watched a single bird fly silently to a large cavity high in a cypress near the river, climb along the edge using bill as well as feet, and disappear inside. Mated pair (molting; gonads not enlarged) taken April 16, at Rancho (Pettingill). Female taken by Sutton on March 1, 1938 (Sutton and Burleigh, 1939: 29).

AZTEC PARAKEET, *Aratinga astec vicinalis*.—Identified with certainty only once in 1941—two, at close range, at the foot of the mountain, April 16 (Sutton). Seen repeatedly February 28 to March 5, 1938; a male specimen was taken by Burleigh, March 1 (Sutton and Burleigh, 1939: 29).

WHITE-CROWNED PARROT, *Pionus senilis senilis*.—Not recorded during the course of our expedition; but Warner took a solitary male on the mountain back from the Sabinas on August 13, 1941. This species apparently has not heretofore been recorded from Tamaulipas.

RED-CROWNED PARROT, *Amazona viridigenalis*.—Noted daily wherever we went. Noisy in the morning, when feeding, and in the evening just before roosting. Usual cry a harsh *kee-ee, craw, craw, craw*. Fed on nuts, berries, buds and flowers, and various larger fruits, taking them in season. Very wasteful, biting only a small chunk from a fruit or pod and dropping the rest.

Courtship was going on at the time of our arrival, many birds being paired, others sparring and chasing (March 12). Such birds sometimes came to grips in mid-air, fluttering upward as if climbing an invisible wire. Devoted males were seen to walk the entire length of a branch in presenting some tidbit to their mates. In late March there was considerable bickering over nest cavities. March 31, Sutton watched one pair finally win out over contenders and settle down in an old Lineated Woodpecker's nest in a big cypress, sixty feet from the ground. Here a parrot's head popped out whenever any of our party made a commotion under the tree.

In our night hunting we occasionally disturbed roosting flocks of Red-crowns, and once (April 7) a flock that we had not disturbed flew screeching past us in the moonlight.

Among the enemies of this species must be mentioned the Ornate Hawk-eagle, which more than once we saw bearing down upon the screaming flocks, and under whose favorite trees we occasionally found bunches of parrot feathers.

YELLOW-HEADED PARROT, *Amazona ochrocephala oratrix*.—Noted only as follows: March 17, three seen in cypress near river; April 1, four seen and one breeding male in fine plumage collected half a mile south of the Rancho (Lea); April 18, several seen in the Rio Frio district, fifteen miles south of the Rancho (Warner). Not seen by senior author's party in 1938.

BLACK-BILLED CUCKOO, *Coccyzus erythrophthalmus*.—Noted twice—April 30, one in brushy woodland three miles north of the Rancho (Pettingill); and May 3, two seen and male (testes somewhat enlarged; tail in irregular molt) taken two miles north of the Rancho (Sutton).

CENTRAL AMERICAN SQUIRREL CUCKOO, *Piaya cayana thermophila*.—Noted daily, March 14 to April 26, at considerable elevation on the mountain (2000 feet) as well as at river-level. Sprightly for a cuckoo, and equipped with a variety of call-notes, the commonest being an imperative *creep-rear*, or *keep-rear*, like one of the Derby Flycatcher's cries but louder; another—something in the nature of a song—a loud *kweep, kweep, kweep, kweep*. Little seen after April 26, perhaps because of nesting activities. Specimens collected March 20 and 28, 1941, and by senior author's party March 1–4, 1938 (Sutton and Burleigh, 1939: 30).

GROOVE-BILLED ANI, *Crotophaga sulcirostris*.—Seen first, April 7—five birds perched near a hut along the main highway. Noted often thereafter. Female (with enlarged ovary) taken April 11 (Lea). Male and female taken by senior author's party, March 1, 1938 (Sutton and Burleigh, 1939: 30).

ROAD-RUNNER, *Geococcyx californianus*.—Noted several times along the highway between Victoria and Mante, but seen near the Rancho only once—a single bird running along a road about two miles east, March 27 (Sutton).

GUATEMALA SCREECH OWL, *Otus guatemalae*.—Trilling sounds which were accredited to Screech Owls were heard on several occasions, by day as well as by night, and at river-level as well as on the mountain, but the genus *Otus* was recorded with certainty only once—on April 11, when a female was shot at the entrance to her nest (Pettingill). The nest tree was at about 1500 feet elevation. The cavity was fifteen feet from the ground. The bird's oviduct was swollen and the ova ranged in size from that of a BB shot to 1/4 inch in diameter. The bird had pale-yellow eyes. It was very fat; and the featherless condition of the toes was at once apparent. The contents of the nest was not determined.

So far as we have been able to determine, *Otus guatemalae* has not heretofore been taken anywhere in Tamaulipas. Our specimen is like the type of *O. g.*

cassini (U. S. National Museum no. 27115) in size, but grayer throughout the upper parts.

MAYAN HORNED OWL, *Bubo virginianus mayensis*.—Recorded but once—a female, with unenlarged ovary and no sign of brood-patch, taken April 10 along the Sabinas near the Rancho (Sutton). This specimen is of the brown, rather than the gray phase. It is large, having a wing of 334 mm. (the wing of the type of *mayensis*, a female, measures only 315 mm.), and may, therefore, if we follow Griscom's concept (see Ibis, 1935: 546), be considered intermediate between *mayensis* and *pallescens*.

FERRUGINOUS PYGMY OWL, *Glaucidium brasilianum ridgwayi*.—Recorded daily and nightly, March 14–April 25, on mountainside in opener woodland, as well as at river-level. Five specimens taken, March 20–April 24. Three of these are gray-phase males, one a grayish-brown male, and one a very brown female. Two males taken by senior author's party March 3, 1938 (Sutton and Burleigh, 1939: 30).

TAMAULIPAS WOOD OWL, *Ciccaba virgata tamaulipensis*.—Fairly common at river-level and along the foot of the mountain. Seen and heard principally on moonlit nights. Seemed to prefer brushier woodland for its hunting, spending much of its time near the ground. Characteristic cry an exhalant *boob, boob, boob, boob, boob*, loudest in the middle of the series.

Three specimens were taken—a female, April 8 (Lea); a male, April 11 (Warner); and a male, April 24 (Sutton). These have been directly compared with the type of *C. v. tamaulipensis* by Mr. James L. Peters, who reports that the second, while "a little buffier below" is nevertheless "very close to the type"; that the third is "also clearly *tamaulipensis*"; but that the first is "not certainly distinguishable from average *centralis*." With the present series (together with two birds from Linares, Nuevo Leon) in hand, he believes *tamaulipensis* to have "dark and pale phases"—a concept Phillips (1911: 76), in naming the race from a single specimen, probably did not entertain.

MEXICAN POTOO, *Nyctibius griseus mexicanus*.—First recorded March 17 when, just after nightfall, Sutton took a breeding male at the foot of the mountain half a mile southwest of the Rancho. Taken thereafter April 8 (female with ova up to ¼ inch in diameter); April 11 (male with much enlarged testes); and April 13 (female with much enlarged ovary). Noted twice at about 1500 feet elevation.

At nightfall these wide-winged birds flapped up from the *huipilla* thickets to prominent perches where, sitting upright, they looked about for prey. Their calls were rough squawks, screams, and hoots, often human in quality, none resembling the word *potoo* very closely. Their eyes shone brilliantly in the rays of our flashlights. They were not particularly wary but we did not succeed in luring them by 'squeaking' or by our ludicrous imitations of their cries.

TEXAS NIGHTHAWK, *Chordeiles acutipennis texensis*.—Noted early in the morning or at nightfall in the vicinity of the Rancho, as follows: a few, April 5; one, April 6; several, above recently cleared fields, April 17; a loose flock moving northward, April 18; two, April 21; and four, April 22. A male and a female taken by Warner, April 17, are of this race, the wing of the male measuring 189 mm., that of the female, 176.

NIGHTHAWK, *Chordeiles minor*.—Included in the list wholly on the basis of a single bird's *pee-ee* call-note. Distinctly heard several times on the evening of April 15. The senior author, during several seasons of field work in the southwestern United States and Mexico, has never heard *Chordeiles acutipennis* give any such cry.

INCA DOVE ON NEST

BUFF-BELLIED HUMMINGBIRD ON NEST

YUCATAN PAURAQUE, *Nyctidromus albicollis yucatanensis*.—Not common. Noted infrequently (never more than one bird at a time) March 15–April 11, in brushland at river-level. Our only specimen, a breeding male taken by Lea, April 7, is very gray above in comparison with *N. a. merrilli* at hand, and is too small for that race (wing, 171 mm.; tail, 158). We follow Peters (1940: 193) in considering *nelsoni* and *sumichrasti* as synonyms of *yucatanensis*.

SALVIN'S WHIPPOORWILL, *Caprimulgus serico-caudatus salvini*.—First recorded early in the morning, April 1, when its readily recognizable *chip-will-low* song was heard. Noted almost constantly on clearer nights, April 6 to 25. Hard to see, for its favorite song-perches frequently were far from roads or trails, in the very thickest of the low-country woodlands. The only alarm note heard was a low *quert*. April 11, two males, with greatly enlarged testes, were taken (Sutton and Warner).

EASTERN WHIPPOORWILL, *Caprimulgus vociferus vociferus*.—Recorded with certainty only on March 30, when a male (with slightly enlarged testes) was taken along the trail at the foot of the mountain; and on April 21, when a male and a female (with somewhat enlarged gonads) were taken at about river-level south of the Rancho (Sutton). The stomachs of all three specimens were packed with insect remains. The first had eaten a huge moth whose abdomen was full of pale green eggs. Not a sound was heard from any of these birds, though on April 21 the allied species, *Caprimulgus serico-caudatus*, which must breed commonly in the region, was in full song.

CHIMNEY SWIFT, *Chaetura pelagica*.—Male (with slightly enlarged testes) taken from loose flocks of swifts along the Sabinas, April 15. Female (ovary not enlarged) taken from small, northward-circling flock of *pelagica* above open field at Rancho, April 27. Probably present in the region between these two dates, since small, dark swifts were seen repeatedly.

TAMAULIPAS VAUX'S SWIFT, *Chaetura vauxi tamaulipensis*.—Small swifts were observed daily along the Sabinas from March 17 to the end of our stay. Most of these probably were of the present form, though specimens were actually collected only on April 11 (male with greatly enlarged testes) and on April 15 (male and two females, each with much enlarged gonads). On fine days the birds flew high, in misty weather low, at about tree-top level. What we took to be copulating was observed from April 11 on, 'pairs' coming to grips in mid-air and falling almost to the ground together. On two occasions birds were seen to fly into hollow trees near the river (Sutton).

CURVED-WINGED SABRE-WING, *Pampa pampa curvipennis*.—Rare. Recorded seven times, March 19–April 10, a singing male being collected March 19 (Sutton). Encountered only in tangles of vines on mountainside southwest of the Rancho, at from 1000 to 1500 feet.

BUFF-BELLIED HUMMINGBIRD, *Amazilia yucatanensis chalconota*.—Common. Noted daily from river-level to highest points reached on mountain (about 2000 feet), in brushy rather than deep woodland. Male taken March 27 (Warner).

Males appeared to have individual feeding territories which they defended vigorously. Courtship observed during latter part of March. First signs of nest-building noted March 30 when, on a rocky slope, a female was seen to gather downy material and spiderweb from a tall cactus. April 22, a nest (two eggs) was found only a few feet from the ground near a woodland road. Here the female remained motionless while Pettingill and Lea placed their cameras within

twelve inches (see Plate 4). April 26, a female was watched as, with sudden upward jerks of her bill, she pulled lichens from a great tree.

BROAD-BILLED HUMMINGBIRD, *Cynanthus latirostris*.—March 30, while making his way along the foot of a cliff southwest of the Rancho (at about 1500 feet), Pettingill discovered a Broad-billed Hummer's nest. It was fastened near the tip of a slender, leafless twig about four feet from the ground. Striking the nest before seeing it, he knocked the two heavily incubated eggs out. Both were broken, one only slightly. The female continued to incubate this damaged egg for a day, then deserted. All of our party had abundant opportunity to observe and identify her. Several photographs were taken. The species was not otherwise recorded during our stay.

PREVOST'S MANGO, *Anthracothorax prevosti prevosti*.—Common. Not seen before April 1, hence thought to be migratory. Males perched on naked, slender twigs in exposed places (usually not far from the ground) when not feeding or wrangling with other males. Along the road between the Rancho buildings and the 'gate' (a quarter of a mile away) eleven males were seen regularly throughout April. In flight they bounded along, chippering noisily. Males and females sometimes fed together about flowering epiphytes growing on trees near the river.

Females were often seen gathering nest material from April 5 on. Only one nest was found, however. This was near the end of a slender dead stub, about fifty feet from the ground, in a solitary cypress near the river. The female worked at least eight days in building this nest.

RUBY-THROATED HUMMINGBIRD, *Archilochus colubris*.—Adult males seen repeatedly about blossoming orange-trees and in patches of bright-red *Salvia*, March 23–27. Male collected March 23 (Pettingill). In April noted on the 22d (male taken by Warner) and from the 28th to the 30th (several females about flowering tree near the river). Molting female taken April 30 (Sutton).

BLACK-CHINNED HUMMINGBIRD, *Archilochus alexandri*.—Recorded with certainty but once—March 19, a male seen clearly at close range in thicket at river-level (Pettingill). Some female hummingbirds seen April 28–30 possibly were of this species also.

COPPERY-TAILED TROGON, *Trogon ambiguus ambiguus*.—Noted daily, sometimes in flocks, more often in groups of three or four. Certain males and females went about as if paired, but flocks composed largely of males were noted as late as May 2; little was seen that could be interpreted as courtship; and the gonads of specimens taken were unenlarged. Our failure to record any other species of trogon is worthy of note.

RINGED KINGFISHER, *Megaceryle torquata*.—Noted infrequently, March 27 to April 25, along the Sabinas. Birds appeared to be mated, and several large burrows were examined, but no occupied nest was discovered.

BELTED KINGFISHER, *Megaceryle alcyon*.—Noted along the Sabinas, March 14–April 8. Male and female seen April 4, appea.ed to be courting. Some of their cries, uttered in flight, were repeated phrases somewhat in the nature of song. There is no description of such a performance in Bent's thoroughgoing account of this species (1940: 111–129).

GREEN KINGFISHER, *Chloroceryle americana*.—One to four birds fished regularly at shallows along the Sabinas near the Rancho. Upstream from these shallows, in a vertical bank, an occupied nest-burrow was discovered March 26 (Sutton). Young were still being fed here when last we visited the place, May 2.

BLUE-CROWNED MOTMOT, *Momotus coeruliceps*.—Noted daily, its owlish *poot, poot* being a familiar sound. Commonest along the river, though several pairs lived in gullies on the mountain at some distance from the water. Male taken March 24 not in breeding condition (Lea). Female with much enlarged ovary taken and partly finished nest-burrow discovered in chunk of earth adhering to roots of overturned tree the following day (Sutton). Two other occupied nests found subsequently—in shadowy banks, among great roots. The birds squawked and grunted when we invaded their nest-territories. One bird, observed near its nest April 30, was bob-tailed, all the rectrices having been worn or broken off, presumably in the burrow.

GOLDEN-FRONTED WOODPECKER, *Centurus aurifrons*.—Fairly common in opener woodland. Pair found working on nest, April 4. Half finished with their excavating, they were beset by a pair of Tityras, who were determined to occupy the cavity themselves. The quarrel lasted several days, but the woodpeckers finally won. Another nest, found April 11, was in a large stub near the river, twenty feet from the ground.

MEXICAN GREEN WOODPECKER, *Chloronerpes aeruginosus*.—Noted on the mountain as well as at river-level; not common. March 27, Warner took a male (with much enlarged testes but no brood-patch) at a recently finished nest, twenty-five feet from the ground, at the top of a stub in mixed woodland. April 18, Sutton observed flicker-like courtship behavior—prancing, bowing, and spreading of wings and tail. April 24, Pettingill discovered a nest. Here, after a perilous trip across the flooded river, he obtained photographs of the parent birds.

Breeding specimens from the Gomez Farias region appear to be the same as strictly comparable material from the Mesa de Chipinque, near Monterrey, Nuevo Leon. This is difficult for one who has worked at both places to comprehend. At Gomez Farias the bird's habitat is tropical. At the Mesa de Chipinque (5000 to 7000 feet elevation) the summer nights are cool and the woods are of oak and pine!

LINEATED WOODPECKER, *Ceophloeus lineatus*.—About as common as *Scapaneus guatemalensis* and found in the same habitat. Distinctly more flicker-like than that species, however, especially as regards courtship behavior and call-notes. Partly finished nest found April 13, in huge cypress along the Sabinas, about ninety feet from the ground.

VERACRUZ IVORY-BILLED WOODPECKER, *Scapaneus guatemalensis regius*.—Fairly common, especially in heavier woodland at river-level. Usual call-note a bleat, distinctly reminiscent of the *kint* of the United States Ivory-bill, *Campephilus principalis*, as heard by the senior author in Louisiana in 1935. Sharp double-rap also like that of *Campephilus*. Two nests found—one (partly finished) halfway up the mountain, at about 1500 feet, April 12; the other, ready for eggs, about fifteen feet from the ground, in leaning dead tree near the river, April 30. Two females, taken April 8, represent the present large subspecies (wing, 198; 201 mm.).

OLEAGINOUS WOODPECKER, *Veniliornis oleaginus oleaginus*.—Recorded on three occasions: March 14, one in small-bird flock, at foot of mountain a mile southwest of the Rancho; March 15, two birds, in the same place; and March 27, a single male collected by Warner at 1500 feet on the ridge between the Rancho and Gomez Farias. Apparently this woodpecker has not heretofore been recorded in Tamaulipas.

TEXAS LADDER-BACKED WOODPECKER, *Dryobates scalaris symplectus*.—Fairly common in brushy woodland at river-level. Courtship noted in early and mid-April.

Nest with eggs found April 26. A female taken by Warner, March 19, is neither very large (wing, 98 mm.) nor strikingly white on the back, but it is pale below and we are convinced that it represents *D. s. symplectus* rather than *D. s. scalaris*, the latter being the race assigned by Ridgway, Hellmayr and others to "southern Tamaulipas."

IVORY-BILLED WOODHEWER, *Xiphorhynchus flavigaster eburneirostris*.—Common in all sorts of woodland and at all elevations visited. Often seen feeding about epiphytes on horizontal branches. What appeared to be mated birds seen as early as March 14, but a female taken that day and one taken March 21 showed no sign of breeding activity. No nest found. Customary call-note *chee-leer*, or *whee-leer*. Song strongly suggested that of the Canyon Wren, *Catherpes mexicanus*.

MEXICAN ANT-SHRIKE, *Thamnophilus doliatus mexicanus*.—Noted daily, March 31–May 2, always in dense tangles near river. The first one seen was a fully adult male. *No other fully adult bird of either sex was seen.* Three males taken (April 12, 15 and 28) were subadult, with gray eyes and slightly enlarged testes. Song a rapidly descending series of hoots, almost rolled, not loud but noticeable, and sometimes terminated by an accented, inhalant note.

Our three males are long-winged and -tailed, hence represent the race *mexicanus* (see Sutton and Burleigh, 1940: 228). They measure: wing, 73, 72, 71 mm.; tail, 73, 74, 70.5. *Thamnophilus doliatus* apparently has not heretofore been recorded north of Alta Mira, Tamaulipas (Richmond, 1896: 630). The senior author's party did not see it in the Gomez Farias region in 1938.

ROSE-THROATED COTINGA, *Platypsaris aglaiae gravis*.—Common. Courtship behavior (crest-lifting and jerky bowing) noted from day of our arrival on. Nest-building first observed April 3, other nests being found virtually every day thereafter in trees near the river, at or near the end of a long swaying branch, from forty to seventy feet from the ground or water. Nests incredibly bulky, one that we collected being a mass of Spanish moss, roughly 12.5 inches wide and 15.5 inches deep, with 2.5-inch-wide entrance at one side, and with masses of moss hanging below and to one side (see Plate 6).

Males and females built nests together. Twittering constantly, they gathered material near and far, flying in with big loads trailing. One of their special cries was a thin *kew*, followed by an odd sputtering. From five to nine days were spent in building a nest.

Occupied nests of the Giraud's Flycatcher, *Myiozetetes similis*, frequently were found within a few feet of, or on the same branch with, the Cotinga nests. The flycatchers followed the Cotingas about, alighting near them with wings fluttering, calling petulantly, sometimes stealing wisps of moss from them. At least six Cotinga nests under close observation during latter April were near nests of this interesting flycatcher.

Watching a pair of Cotingas for two hours on the morning of April 25, Sutton saw both birds add mouthful after mouthful of moss to their already enormous nest; watched the female enter (to lay an egg or incubate); and followed the male to a treetop hung with vines, where the bird proceeded to sing uninterruptedly for over half an hour. The song was a conversational *chi-zoo, wheez-oo, chi-zoo, kee-zoo*, repeated over and over, with pauses of a second or more after each group of four syllables.

MEXICAN MASKED TITYRA, *Tityra semifasciata personata*.—Common. Some birds mated at time of our arrival, others going about in threes or fours, perching drowsily in a leafless treetop for a time, then suddenly chasing each other, giving

TEXAS DERBY FLYCATCHER AT NEST

NESTS OF TEXAS DERBY FLYCATCHER (left, *in situ*) AND BOAT-BILLED FLYCATCHER

a dry *quert, quert* call-note. Courtship included snapping off and presentation of twigs accompanied by head-wagging.

Nest-hunting first observed April 1. Thereafter pairs at nests were the rule. April 10, a female was seen to carry forty-two twigs to her nest (an old woodpecker hole) in half an hour. During this time she received no direct assistance from her mate. April 17, at another stub, both the male and the female were seen to carry twigs *out of* their nest. April 4 to 8, a pair at the Rancho sparred fiercely with a pair of Golden-fronted Woodpeckers who were doing their best to finish a nest for their own use.

April 25, a pair were collected at the Rancho. The female was laying eggs. Within two hours the deserted nest was claimed by a pair of Sulphur-bellied Flycatchers, who in turn were forced to expel three other pairs of Tityras!

EASTERN PHOEBE, *Sayornis phoebe.*—Single bird noted near the Rancho, March 20–23.

MEXICAN VERMILION FLYCATCHER, *Pyrocephalus rubinus mexicanus.*—On the senior author's first visit to the Gomez Farias region this species was fairly common along the Sabinas (Sutton and Burleigh, 1939: 33). In 1941 it was rare. Lone male and three females noted March 24. Single male seen April 5. Male collected April 14 (Lea).

COUCH'S KINGBIRD, *Tyrannus melancholicus couchi.*—Seen nowhere before April 18, hence probably arrived from the south on that date. From the 18th to the 27th, uncommon; thereafter abundant, several pairs taking up their residence near the Rancho. Territorial disputes settled by about the end of the month. Most song-like utterance a loud *fit-breer,* the latter syllable a rolled chatter.

SULPHUR-BELLIED FLYCATCHER, *Myiodynastes luteiventris luteiventris.*—First seen April 4, a single bird. Male (slightly enlarged testes) taken the following day. Four birds seen April 7. By April 10, the species had arrived in full force, courtship activity and noisy fighting over nest-cavities being constantly observable. Did not settle down to nesting until considerably later, however, egg-laying females being taken April 21 and May 3. Usual cry a sharp *his-eéce* or *whee-zeé-ah.* Song a softer *chu-eer.* Alarm cry a woodpecker-like *puck.*

Our specimens are more richly colored throughout than two virtually topotypical *M. l. swarthi* from the Santa Rita Mountains, Arizona.

MEXICAN BOAT-BILLED FLYCATCHER, *Megarynchus pitangua mexicanus.*—Common. Some pairs established on territories at time of our arrival, but nest-building did not commence until April 7. Several nests found. These were shallow, made of twigs, thinly lined with finer material, placed in stout crotches, and wholly unlike the bulky, spherical nests of the Derby Flycatcher (see Plate 5). The senior author was careful to note these differences time after time, and is now convinced that the "very bulky" *Megarynchus* nest reported from Tamazunchale, San Luis Potosí, was that of *Pitangus* (Sutton and Burleigh, 1940: 228). Pairs that lived near the Rancho proceeded deliberately with nidification. One nest almost completed April 13, held its first egg ten days later.

The song of this noisy, pugnacious species was a clearly enunciated *cree-kill-rick,* repeated sometimes thirty or forty times at a sitting. Familiar call-notes were a sharp *kee-wick,* and a rough, petulant *kair-r-r-r-r.*

GIRAUD'S OR SOCIAL FLYCATCHER, *Myiozetetes similis texensis.*—Abundant. Some birds paired at the time of our arrival though the ovary of a female taken March 22 was only slightly enlarged. Nest-building first noted April 4, the nest being high in a tree near the river, close to a partly finished Rose-throated Cotinga's

nest. Like the Cotingas, the flycatchers continued building for several days, adding material even after the eggs had been laid. Nest roughly spherical, with entrance at the side.

By the end of April, twelve nests were under observation. Each of these was near the nest of some other species—six near Rose-throated Cotingas' nests, one near a Boat-billed Flycatcher's, one near a Derby Flycatcher's, and four near Alta Mira Orioles' nests. The flycatchers were constantly on the move, fanning their wings even while perching, looking about as if for trouble, and uttering peevish cries, one of which resembled the *cheep* of a barnyard chick whose toe has been pecked!

TEXAS DERBY FLYCATCHER, *Pitangus sulphuratus texanus*.—Noisy and noticeable, hence thought of as common. By actual count less common than the Boat-billed Flycatcher, there being but two pairs of *Pitangus* near the Rancho to six pairs of *Megarynchus*. Mated at time of our arrival. A pair living near us started their nest April 1, completing it April 14. Egg-laying began April 23, and incubation started April 29. The birds showed surprisingly little concern. We frequently saw them along the river, a quarter of a mile away, but our approaching the nest rarely incited them to outcry. Perhaps this was because they were accustomed to our comings and goings (Plate 5).

Call-note was a sharp *geep*, sometimes elaborated into *geep career!* or *geep, geep, career! Megarynchus* had no call-note resembling this, so pairs of either species were easily located from cries alone.

CRESTED FLYCATCHER, *Myiarchus crinitus*.—Identified with certainty but once, March 25, when a female (ovary unenlarged) was taken two miles south of the Rancho in open woodland along the foot of the mountain (Sutton).

MEXICAN CRESTED FLYCATCHER, *Myiarchus tyrannulus nelsoni*.—Noted first April 5, when several arrived simultaneously, two males (testes somewhat enlarged) being collected that day. Common thereafter, pairs establishing themselves on territories by April 22 (male with greatly enlarged testes taken). A pair began their nest in a horizontal stovepipe that stuck out from one of the Rancho buildings, April 26. Construction work continued until May 1. We could not see into the nest hence did not determine when egg-laying began.

ASH-THROATED FLYCATCHER, *Myiarchus cinerascens cinerascens*.—Identified with certainty but once, March 18, when a female (ovary unenlarged) was taken along the Sabinas (Warner). This specimen agrees with other *M. c. cinerascens* at hand in having the tenth (outermost) primary equal in length to the fourth.

LAWRENCE'S DUSKY-CAPPED FLYCATCHER, *Myiarchus tuberculifer lawrencei*.—Noted March 14–24, during which period four specimens (a single male, a 'pair,' and a single female) were collected. In none of these did we find evidence of breeding activity. After March 24, recorded as follows: April 8, four in a thicket near the river; April 12, one at foot of mountain; April 26, one near Rancho buildings.

OLIVE-SIDED FLYCATCHER, *Nuttallornis borealis*.—Male (fat; testes unenlarged) taken April 27 (Lea). One seen in low tree near Rancho buildings, May 2.

EASTERN WOOD PEWEE, *Myiochanes virens*.—Male (with somewhat enlarged testes) collected along the Sabinas, April 25 (Sutton). Single birds seen and heard, April 30 and May 1.

WESTERN WOOD PEWEE, *Myiochanes richardsoni richardsoni*.—Singing birds noted repeatedly in brushy woodlot near the Rancho, May 1–3. Male, with testes somewhat enlarged, taken May 1 (Sutton).

SWAINSON'S PEWEE or *José Maria, Myiochanes pertinax pertinax.*—Noted March 14–28. Two females taken: March 24; March 28. In 1938, a female was taken March 1 and a male March 3 (Sutton and Burleigh, 1939: 34). Gomez Farias birds are not quite so dark as topotypical *M. p. pertinax,* but they are green-backed in comparison with freshly plumaged *M. p. pallidiventris* from the Santa Rita Mountains of Arizona.

YELLOW-BELLIED FLYCATCHER, *Empidonax flaviventris.*—Not recorded during the course of our expedition; but Warner took an adult male near the Rancho on August 13, 1941.

LEAST FLYCATCHER, *Empidonax minimus.*—Noted March 22–May 2. Six specimens taken, all in prenuptial molt. In three of these the outer primary is distinctly shorter than the sixth (counting from the outside); in three it is either shorter than or equal to the sixth; in none is it "longer than 6," a character considered by Taverner (Birds of Western Canada, 1926: 251) to be diagnostic of this species. Measurements of males: wing, 60.5 mm., 63.5, 64, 57; tail, 54, 53, 57, 50; of females, wing, 59, 59; tail, 51, 50. A living bird examined May 2 appeared to be in perfect breeding plumage.

HAMMOND'S FLYCATCHER, *Empidonax hammondi.*—A puzzling *Empidonax* (sex not satisfactorily determined) taken March 25 apparently is closer to *hammondi* than to any other species. It is darker on the throat and breast and yellower on the belly than any of the six *minimus* above described. Its measurements (wing, 64 mm.; tail, 50.5) suggest that it is probably a female. The outermost primary is shorter than the sixth, counting from the outside.

WRIGHT'S FLYCATCHER, *Empidonax wrighti.*—Specimen taken in Gomez Farias region on March 5, 1938 (Sutton and Burleigh, 1939: 34). Not recorded by us in 1941.

BEARDLESS FLYCATCHER, *Camptostoma imberbe imberbe.*—Fairly common about the Rancho, where we heard its finely lisped cry occasionally, March 15–April 5; took a male (testes slightly enlarged) April 6; and observed courtship and nest-building in latter April.

April 21, at sun-up, we traced an unfamiliar bird-sound to the top of a thin-leafed tree where, perched on an exposed twig, a Beardless Flycatcher was singing as it looked sharply about. The six-syllabled performance, written down at the time as *chew-did-ee, chew-did-see,* was repeated over and over, thirty times or more. During the last week in April and early in May such sunrise singing was noted daily.

April 21, a pair were discovered at work upon their nest twenty-five feet up in a big cypress at the river's edge. It was invisible from the ground, being in a festoon of moss (Sutton).

ROUGH-WINGED SWALLOW, *Stelgidopteryx ruficollis serripennis.*—Noted throughout our stay, a large flock flying over a sugar-cane field south of Mante, March 12; smaller flocks, or pairs, along the Sabinas thereafter. By April 7, two pairs had established themselves near the Rancho. Here nest-digging began about April 15. Female and male specimens taken April 11 and 21, respectively.

VIOLET-GREEN SWALLOW, *Tachycineta thalassina.*—Small flocks noted along the Sabinas March 18 and April 1.

MEXICAN CROW, *Corvus imparatus.*—Abundant at Mante. Fairly common three miles south of the Rancho, in farming district. Uncommon about the Rancho proper. Call-note a hollow, wholly unmusical *gar-lic* or *cow-rah.*

PALE-BELLIED BROWN JAY, *Psilorhinus morio palliatus*.—Noted in flocks as well as in pairs throughout our stay. Bird seen building nest March 21, but this nest was not completed. Twig-carrying observed almost daily throughout April, though only one finished nest was found. This held three eggs April 21, six eggs April 23. It was about fifteen feet from the ground at the edge of the forest. The eggs were buffy gray, spotted with brown. The brooding female (?) was surprisingly wary.

One of our three specimens (male, April 21) is quite as pale on the belly as a topotypical *palliatus* at hand; the other two (females: March 23, April 14) are a trifle darker, though not by any means dark enough for *P. m. morio*.

GREEN JAY, *Xanthoura luxuosa luxuosa*.—Fairly common, especially in brushy woodland at river-level. Noted in small flocks in latter half of March and throughout April. Neither a male taken March 26 nor a female taken April 10 showed signs of breeding activity. Two birds encountered May 2 acted as if they might have been a pair with nest.

Our specimens show no trace of the pale blue that is evident in some topotypical *X. l. glaucescens* at hand. The female is small, however (wing, 111 mm.; tail, 127), having almost exactly the average measurements of the seven female specimens of this northern race handled by Ridgway (wing, 112; tail, 127.5).

BLACK-CRESTED TITMOUSE, *Parus atricristatus atricristatus*.—Fairly common in wooded country, on the mountain as well as at river-level. Seen in small-bird flocks at late as March 29, though at least one pair was known to be nesting March 27. Female, with slightly enlarged ovary, taken March 25 (wing, 69 mm.; tail, 60.5).

BERLANDIER'S WREN, *Thryothorus ludovicianus berlandieri*.—Heard infrequently March 19–April 15, always on the mountain west or southwest of the Rancho, and not once at river-level. Breeding male taken at about 1500 feet, April 15 (Sutton).

TAMAULIPAS SPOTTED-BREASTED WREN, *Thryothorus maculipectus microstictus*.—Fairly common in dense tangles, especially along the river. Almost always seen in pairs. Three males taken: March 26, April 10, April 20. In none of these were the testes greatly enlarged.

WESTERN HOUSE WREN, *Troglodytes domesticus parkmani*.—House Wrens lived about the Rancho buildings throughout our stay. Several of these sang vigorously; some occasionally scolded; and one was seen even to carry a twig in its bill (Pettingill, April 3). Two specimens collected (male, April 28, Sutton; and male ?, April 21, Warner) were not in breeding condition, however. The former of these is clearly *parkmani;* the latter is rather buffy on the chest and rufescent on the flanks for that form, but more like *parkmani* than the "lighter, more grayish phase" of *T. d. baldwini* mentioned by its describer (see Oberholser, H. C., 'A Revision of North American House Wrens,' Ohio Journ. Science, 34: 91, 1934).

WHITE-BELLIED WREN, *Nannorchilus leucogaster leucogaster*.—Fairly common at river-level in *huipilla* thickets; almost never seen elsewhere. Observed in pairs at time of our arrival. Presence usually made known by the dainty, tinkling song which was sometimes so faint as to suggest the 'whisper song' of some other species. Testes of males taken March 25–27 greatly enlarged.

With our fresh breeding series from the Gomez Farias region we now have sixteen *Nannorchilus leucogaster* specimens in the Cornell collection. Two of these, from Valles, San Luis Potosí, should represent the race *N. l. grisescens;* but there are individuals in our Gomez Farias series just as gray above and just as pale-flanked as the Valles birds, and we therefore feel that *grisescens* merely

represents the gray extreme of *N. l. leucogaster,* and that it probably is to be found in any breeding population of that race.

CANYON WREN, *Catherpes mexicanus.*—Found only about cliffs west and southwest of the Rancho. A male, with somewhat enlarged testes, taken by Warner, March 25, is the darkest-backed individual in a series of eight eastern Mexican specimens at hand (three from Hidalgo, four from the Mesa de Chipinque, Nuevo Leon), and we should not hesitate to call it a richly colored example of *C. m. mexicanus* but for the fact that it is too small for that race, its wing measuring 62 mm., its tail, 50. Our three Hidalgo *mexicanus* (virtually topotypes) measure: males, wing, 68, 64; tail, 57.5, 54; female, wing, 65; tail, 56. For the present we can hardly call the Gomez Farias bird anything but intermediate between *mexicanus* and *albifrons,* though such a disposition unfortunately is based almost wholly on size.

LONG-BILLED THRASHER, *Toxostoma longirostre.*—Fairly common in thickets in low country and on mountain. Occasional singing heard in latter March and early half of April. Specimens taken March 30 to April 10 not in breeding condition. Brilliant, long-continued singing from definite song-perches heard from April 25 on.

Our three specimens are intermediate between *longirostre* and *sennetti.* They are perceptibly buffier below and more rufescent above than comparable *sennetti* from Brownsville, Texas, and Monterrey, Nuevo Leon; but they are short-billed, and their wing and tail measurements are those of *sennetti:* male, wing, 99 mm., tail, 128; females, wing, 95, 94; tail, 124, 122.

BLUE MOCKINGBIRD, *Melanotis caerulescens caerulescens.*—Male taken along the Sabinas near the Rancho by the senior author's party, March 2, 1938 (Sutton and Burleigh, 1939: 37). Obviously a rare bird in Tamaulipas for we find no mention in Ridgway or Hellmayr of its occurrence north of Veracruz. Not seen by us in 1941.

CATBIRD, *Dumetella carolinensis.*—Seen daily throughout our stay, as many as twelve or thirteen being counted March 22, when a wave of transients may have passed through. Two males and a female taken, March 25–April 21. In none of these were the gonads enlarged.

MOCKINGBIRD, *Mimus polyglottos.*—Rare about the Rancho proper, being seen there but once (March 19, Pettingill). Common along the highway to the south, especially between the Sabinas and Frio Rivers. One of the few birds seen regularly at the edge of the extensive palmetto forests.

JALAPA ROBIN, *Turdus assimilis assimilis.*—Recorded frequently, March 14 to April 1, less frequently during first half of April. Last seen (two birds, probably not a pair) April 20. Usually encountered in heavy woods on mountainside rather than in cypresses along river. Call-notes a low *cluck* or *chuck* and a fine *seet,* the latter quite unlike any call-note of *Turdus migratorius.* Male and female (with slightly enlarged sex organs) taken March 22 and 23, respectively (Sutton).

TAMAULIPAS GRAY'S ROBIN, *Turdus grayi tamaulipensis.*—Seen throughout our stay, infrequently from March 14 to 21, more commonly thereafter; usually in mixed flocks of small birds up to April 11, in pairs thereafter. Male with slightly enlarged testes taken by Warner, March 27. Breeding male (testes 13 × 7.5 mm.) taken April 16 (Sutton). Breeding pairs encountered at river-level as well as on mountain.

The song was deliberate, repetitious, meditative rather than declamatory, alto in general effect.

BROWN-BACKED SOLITAIRE, *Myadestes obscurus.*—Noted March 21–24, at river-level and on mountain. Full songs heard several times during this period. A female was taken along the Sabinas on March 4, 1938 (Sutton and Burleigh, 1939: 38).

RUSSET-BACKED THRUSH, *Hylocichla ustulata ustulata.*—A male specimen taken by the senior author, February 28, 1938, was erroneously identified as *H. fuscescens salicicola* (Sutton and Burleigh, 1939: 38). A correction was published (Sutton, Auk, 58: 584, 1941). No thrush of the genus *Hylocichla* was recorded in 1941.

BLUE-GRAY GNATCATCHER, *Polioptila caerulea caerulea.*—Gnatcatchers were seen daily, usually in brushy woodland at river-level, but sometimes high on the mountain. Our only specimen, a female taken April 16 (Warner), is very white below; the exposed part of the outermost rectrices is wholly white; and the measurements clearly indicate the familiar eastern United States, rather than the Mexican, race (wing, 52 mm.; tail, 52).

RUBY-CROWNED KINGLET, *Corthylio calendula.*—Seen only once, a single bird in mixed bird flock along the Sabinas, March 14. In 1938, the senior author's party recorded it several times, February 26–March 5 (Sutton and Burleigh, 1939: 38).

CEDAR WAXWING, *Bombycilla cedrorum.*—Noted March 14–April 15, always in flocks, at river-level. Male taken March 30 (Warner).

SOUTHERN SHRIKE, *Lanius ludovicianus.*—Noted in open country between El Limon and Mante on our weekly trips for provisions. Not seen at the Rancho.

MEXICAN PEPPER-SHRIKE, *Cyclarhis gujanensis flaviventris.*—Female, with unenlarged ovary, collected in brushy woodland a mile north of the Rancho, March 19 (Pettingill). Apparently this bird has never before been taken in Tamaulipas, so our record may well be the northernmost for the family Cyclarhidae.

WHITE-EYED VIREO, *Vireo griseus griseus.*—White-eyed Vireos were recorded daily, pairs on their nest-territories from April 22 on. Partly finished nest found April 30. Breeding birds probably *V. g. micrus.* A female specimen (ovary unenlarged; wing, 62 mm.) taken by Warner, March 23, belongs to the northern race, *V. g. griseus,* however.

BELL'S VIREO, *Vireo belli belli.*—Single bird seen in roving band of gnatcatchers, March 23. Full songs heard April 23–May 1. A singing male (wing, 56; tail, 44 mm.) collected at Rancho, April 23 (Sutton), is too brightly colored for *V. b. medius.*

BLUE-HEADED VIREO, *Vireo solitarius solitarius.*—Noted throughout our stay, usually in roving flocks of small birds. Singing heard first March 27, again April 3, daily from April 6 on. Three molting females taken: March 20, March 23, April 11. These are too brightly colored for any western race, and their bill-size and wing-length (72, 73, 74.5 mm.) indicate *V. s. solitarius* rather than *V. s. alticola.*

YELLOW-GREEN VIREO, *Vireo olivaceus flavoviridis.*—Obviously not resident, for we did not encounter it before April 9. That day one bird was seen. During mid-April, it became steadily commoner until, by the 20th, it was abundant. Singing noted from April 9 on. Males taken April 9, 10, 14, 20 and 28, showed steady increase in testis-size, those of the last-named specimen measuring about 6 × 7 mm. Scolding in defense of nest-territory noted from April 27 on.

EASTERN WARBLING VIREO, *Vireo gilvus gilvus.*—Singing male, with somewhat enlarged testes, taken at Rancho, April 29 (Sutton).

BLACK AND WHITE WARBLER, *Mniotilta varia*.—Noted throughout our stay at all elevations. Most individuals seen in latter March and first half of April were molting. Migratory wave probably passed through May 2 when about thirty birds were seen.

TENNESSEE WARBLER, *Vermivora peregrina*.—Noted April 26–May 2, principally in leafless trees near the Rancho. Female taken April 27 (Sutton).

EASTERN ORANGE-CROWNED WARBLER, *Vermivora celata celata*.—Noted March 14–31 and April 7–8. Our only specimen, a male taken March 24, is in fresh plumage (signs of molt about head). While strongly yellowish both above and below, it is too small for *V. c. orestera* (wing, 59; tail, 48 mm.).

NASHVILLE WARBLER, *Vermivora ruficapilla ruficapilla*.—Abundant March 27–31, especially on the 29th, when loose, roving flocks were seen on the mountain above the Sabinas. Less common in early April, one to three birds a day being the rule. Common April 29–May 3. Our three specimens (female, March 27; molting male, March 31; male, April 30) all are of the eastern race.

SENNETT'S WARBLER, *Compsothlypis pitiayumi nigrilora*.—Common. In full song March 14. Pair seen copulating March 20. Nesting pairs noted along river as well as on mountain up to about 2,000 feet. Brooding female taken April 30. Certain individuals seen by Pettingill in flocks of transient warblers in latter April may have been *C. americana* rather than the present species.

EASTERN YELLOW WARBLER, *Dendroica aestiva aestiva*.—The Yellow Warbler was noted April 23–May 3, singing males April 23–28, males and females thereafter. Our three specimens, all males, were sent to James L. Peters for direct comparison with the type of *"Dendroica aestiva ineditus."* Mr. Peters reports them all "too small . . . too green above and too heavily streaked beneath" for that form, identifies one (May 1) as *D. a. amnicola*, and expresses the opinion that the two others (April 23, April 26) may possibly represent that "involved population" of the Great Basin slope of the Sierra Nevada and Cascade ranges that is considered by van Rossem (1931: 283) to be *D. a. morcomi*. In view of the fact that breeding birds from Ithaca, New York, obviously vary so *inter se*, we prefer to call these two birds *D. a. aestiva* until it becomes clearer to us what the characters of *morcomi* really are.

"Dendroica aestiva ineditus" is a very unsatisfactory race. Described from Matamoros, Tamaulipas, a point at which no Yellow Warbler breeds, and from fall specimens which may well represent several breeding populations, if not actual races, it cannot be placed geographically; the guess that it breeds "in the mountains of western Tamaulipas" is, in our opinion, a wholly unjustifiable one (see Griscom and Crosby, 1926: 29, and Hellmayr, 1935: 367).

NEWFOUNDLAND YELLOW WARBLER, *Dendroica aestiva amnicola*.—According to Mr. Peters our male specimen taken May 1 (see above) is "almost an exact match for the type of *amnicola*" except for the concealed reddish shaft streaks of the crown, a character which is not present in the type itself but "present to a lesser degree" in two other Newfoundland specimens in the M. C. Z. collection. It measures: wing, 62 mm.; tail, 47.

MAGNOLIA WARBLER, *Dendroica magnolia*.—Male with unenlarged testes taken April 2 (Pettingill).

MYRTLE WARBLER, *Dendroica coronata*.—Male seen at close range near the Sabinas, March 17. Molting, but white of throat obvious (Sutton).

AUDUBON'S WARBLER, *Dendroica auduboni*.—Several seen in thicket north of Rancho, March 19 (Pettingill).

BLACK-THROATED GREEN WARBLER, *Dendroica virens virens*.—Seen daily. Most birds seen in March and first week of April, molting about head. Noticeably more common and more inclined to singing from April 4 on. Male and two females taken March 16, 27 and 29, respectively.

BLACKBURNIAN WARBLER, *Dendroica fusca*.—Male taken May 1 in high tree along river (Pettingill).

YELLOW-THROATED WARBLER, *Dendroica dominica*.—Recorded March 13, a singing male in ceiba tree in Mante (Sutton); and March 25, male in cypress tree along the Sabinas (Lea). Color of superciliary stripe not satisfactorily determined in either case.

CHESTNUT-SIDED WARBLER, *Dendroica pensylvanica*.—Noted May 1 and 2. Male taken May 1 (Pettingill).

BAY-BREASTED WARBLER, *Dendroica castanea*.—Male with slightly enlarged testes taken April 2 (Pettingill).

LOUISIANA WATER-THRUSH, *Seiurus motacilla*.—One or two seen daily along the Sabinas, March 19–April 11. Recorded once thereafter, April 22. Full song heard but once, March 28. Two males taken: March 28 (Lea); April 4 (Pettingill).

MACGILLIVRAY'S WARBLER, *Oporornis tolmiei*.—Male seen near Rancho, April 14, 18, and 19. Male (fat; testes slightly enlarged) taken May 1 (Pettingill). Several seen and female taken, May 2 (Pettingill). Two males seen in thickets a mile or so north of Rancho, May 3. No songs heard.

YELLOW-THROAT, *Geothlypis trichas*.—Recorded March 21 to April 30, chiefly about ditches along highway near El Limon and Mante, less frequently about the Rancho. A male (no evidence of molt; testes slightly enlarged) taken April 30 by Sutton, belongs to the race at present known as *G. t. occidentalis*.

GROUND-CHAT, *Chamaethlypis poliocephala*.—Single bird noted April 27–28, in Napier grass between Rancho buildings and river (Sutton).

YELLOW-BREASTED CHAT, *Icteria virens virens*.—Chats were seen infrequently, in thickets, usually not far from the river. Noticeably commoner from April 27 on. Singing noted May 2. No molting birds observed. Two specimens of the eastern race were taken, a female, April 13 (Warner), and a male, May 2 (Pettingill). The former is strikingly small (wing, 70 mm.; tail, 67; culmen, 13.1; tarsus, 23.2), the latter average (wing, 75 mm.; tail, 73).

LONG-TAILED CHAT, *Icteria virens auricollis*.—A male chat taken by Pettingill March 23 belongs to this western race. Though small-billed (culmen, 13 mm.) its wing measures 77, its tail 86.

WILSON'S WARBLER, *Wilsonia pusilla*.—Recorded in brushy woodland at river-level, from four to twenty individuals daily. No molting birds observed.

FAN-TAILED WARBLER, *Euthlypis lachrymosa lachrymosa*.—Found only in tangles of vines and shrubbery on steep, rocky slopes. Female with unenlarged ovary taken March 29 (Pettingill). Two males with much enlarged testes taken April 6 (Sutton). Singing males and mated pairs noted from April 15 on. Song bright and varied, rather like that of *Basileuterus culicivorus* but louder, and ending on a down-stroke rather than an up-stroke.

BRASHER'S WARBLER, *Basileuterus culicivorus brasheri*.—Fairly common on mountain west of Rancho, especially in shaded *huipilla* thickets near base; not often encountered elsewhere. Pairs noted throughout our stay, full songs and alarm notes (indicating nest-territories) being heard from March 14 on. Song suggestive of Chestnut-sided Warbler's: *wich-y, chi-pit, peechy*. Alarm-note a feeble

NEST OF RIDGWAY'S ARREMONOPS

NEST OF ROSE-THROATED COTINGA

disyllable: *chi-chit*. Our two specimens (males, March 28, Pettingill) show only a trace of rufous in the crown patch.

HOUSE SPARROW, *Passer domesticus*.—Common at Mante and El Limon, and in villages along the main highway. Not seen at the Rancho proper nor in Gomez Farias (Lea).

PREVOST'S CACIQUE, *Amblycercus holosericeus holosericeus*.—Noted infrequently March 24–May 3, always near ground, in dense tangles along the river. Call-note most frequently heard, a low bleat. April 21, Pettingill saw three, one of which sang. Mated pair collected May 3 (Sutton).

RED-EYED COWBIRD, *Tangavius aeneus aeneus*.—Noted in mixed flocks of blackbirds that frequented the streets and roosted in ornamental trees in the plaza at Mante, March 11–13. Recorded often at the Rancho, usually in clumps of bamboo near the river. Male with somewhat enlarged testes taken April 3 (Sutton). Displaying of males observed from April 11 on. Nest-hunting female seen slipping through undergrowth, April 27.

COWBIRD, *Molothrus ater*.—Common in Mante March 11–13. Individuals closely observed appeared to be small, hence were thought to be *M. a. obscurus*. Our only specimen, a solitary male taken at the Rancho, April 29 (Sutton), proves to be of the stubby-billed eastern race, however (wing, 109; tail, 76; culmen, 16).

MESQUITE GREAT-TAILED GRACKLE, *Cassidix mexicanus prosopidicola*.—Common. Most birds seen March 14–April 10, were flying over, though four males performed constantly in palmettos near the Rancho. Ovary of female taken April 11 considerably enlarged. Females seen building nest in cypress tree at river's edge, April 14. The colony here numbered about forty birds. Our female specimen (wing, 151 mm.; tail, 150; culmen, 34) is darker below than topotypical *prosopidicola* at hand. Females from the Tamesi River, in extreme southern Tamaulipas, and from Tamazunchale, San Luis Potosí, are still darker, indicating that we may expect to find gradual deepening of color as we approach Veracruz, the restricted type locality of *C. m. mexicanus*.

BREWER'S BLACKBIRD, *Euphagus cyanocephalus*.—Flocks of middle-sized blackbirds seen flying over the Rancho during latter March probably were of this species. Identified with certainty only at Mante, however, where several males were seen walking about the streets with mixed flocks of Cowbirds, March 12 and 13.

BULLOCK'S ORIOLE, *Icterus bullocki*.—Middle-sized, dull-colored orioles were seen near the Rancho several times, April 16–May 2. Two specimens (female, April 16, Warner; subadult male, April 30, Sutton) prove to be *bullocki*, both being decidedly gray-backed, light-bellied, and pale in general appearance.

ORCHARD ORIOLE, *Icterus spurius*.—Adult and subadult male taken from company of three along river, April 28 (Sutton). Adult male noted April 29 (Pettingill).

BLACK-HEADED ORIOLE, *Icterus graduacauda graduacauda*.—Seen frequently in latter March in small-bird flocks. First sign of pairing noted April 3. Half-finished nest found April 19, twelve feet from ground toward end of drooping bough at edge of clearing. Female very secretive while gathering palmetto fibers, but bold in defense of her nest when Brown Jays approached. Six pairs thought to be nesting near Rancho May 1.

ALTA MIRA ORIOLE, *Icterus gularis tamaulipensis*.—Common at river-level and, during latter March before nest-building started, at higher elevations, in mixed bird flocks. Definite pairs first observed April 1. First nest (high in cypress along river) found April 3. Partly finished nests found almost daily thereafter,

invariably in exposed situations, often in leafless trees. Nest examined May 2 held one fresh egg (Lea).

SENNETT'S HOODED ORIOLE, *Icterus cucullatus sennetti*.—A pale, probably subadult female oriole taken by Lea, May 1, is so short-winged and -tailed that, even allowing for wear, we can hardly call it anything but *I. c. sennetti* (wing, 76 mm.; tail, 82). Five female *sennetti* handled by Ridgway averaged: wing, 79.5; tail, 86.4.

HOODED ORIOLE, *Icterus cucullatus cucullatus*.—Noted daily sipping nectar from blossoms, March 14–29. Appeared to be mated during this period. Female seen carrying nest-material, April 1. Completed nest found under palmetto leaf April 6. Nest at Rancho built in ten days, the female doing the work. Male taken at Rancho by senior author, March 5, 1938 (Sutton and Burleigh, 1939: 42).

RED-WINGED BLACKBIRD, *Agelaius phoeniceus*.—Seen weekly in vicinity of Mante and El Limon, but not at Rancho.

EASTERN MEADOWLARK, *Sturnella magna*.—Noted in open country about Mante and El Limon, songs being invariably those of *magna* rather than of *neglecta*. Not recorded at the Rancho in 1941, though seen there (species uncertain) in 1938 (Sutton and Burleigh, 1939: 42).

LESSON'S EUPHONIA, *Tanagra affinis*.—Seen daily, usually about clumps of mistletoe. Females with well-defined brood-patches collected March 20 and 22. Young just out of nest seen March 22. Nest with young found March 27. Noisy young seen with parents from March 28 on. Male in first stages of postjuvenal molt taken April 30. Birds seen gathering nest-material as late as April 14. One call-note of the adult, a high *see-see-see, dewd-see*, was usually given from the very top of a tree.

BONAPARTE'S EUPHONIA, *Tanagra lauta lauta*.—Small flocks (probably family groups) seen March 21–April 13, usually in thinly leaved trees not far from the ground. Subadult males, with olive-green backs and somewhat-enlarged testes, taken March 21 and 24 (Pettingill). Adult male in high plumage taken April 13 (Warner). Usual call-notes suggested certain flock-calls of the Chickadee, *Penthestes atricapillus*.

SUMMER TANAGER, *Piranga rubra rubra*.—Seen infrequently, April 5–May 2. Male in high plumage (testes somewhat enlarged) taken April 5. Subadult male, with sprinkling of red on face, throat, crown and back, taken April 13. Subadult male, with foreparts largely rose-red, taken April 17. These measure, respectively, wing, 100, 94, 94 mm.; tail, 78, 76, 79. The first is large enough for *P. r. cooperi*, but altogether too dark a red both above and below for that race. A male in the Cornell University collection (Langtry, Valverde County, Texas, April 26, 1901) is precisely the same sort of bird, *P. r. cooperi* in size (wing, 100; tail, 80), but *P. r. rubra* in color.

WHITE-WINGED TANAGER, *Piranga leucoptera leucoptera*.—Brightly plumaged male taken along foot of mountain one mile southwest of Rancho, March 4, 1938 (Sutton and Burleigh, 1939: 43). Not seen in 1941.

WESTERN TANAGER, *Piranga ludoviciana*.—Recorded repeatedly at all elevations. Most birds seen in latter March appeared to be females or subadult males. Thirty birds, in loose flock, seen on mountain above river, March 29. Call-note heard that day a Bobolink-like *wit* or *weet*. Males in high plumage noted in latter part of April and early May. Male in mixed plumage taken in Rio Frio district, April 18 (Warner).

LAFRESNAYE'S TANAGER, *Piranga bidentata sanguinolenta*.—Probably fairly common in deeper woodlands though not often seen. Subadult male, with slightly

enlarged testes, taken on mountain, March 28 (Pettingill). Adult male (testes about 4 × 5 mm.) taken March 29 (Sutton). Subadult male with much enlarged testes taken in Rio Frio district, April 5 (Warner). Song instantly recognizable as a tanager's, somewhat husky, though not especially low in pitch nor drawled. Call-note: *per-dick-er.*

BLACK-HEADED SALTATOR, *Saltator atriceps atriceps.*—Single bird seen March 15. One or two birds noted daily, March 16–19. Flock of seven seen March 20. Fairly common thereafter, especially in bamboo tangles near the river. Ovaries of females taken March 20–April 4 only slightly enlarged. Males taken April 14–22, had greatly enlarged testes (16 × 8 mm.). Call-notes loud and clearly enunciated: *chuck, chu-eep, chu-eek,* and combinations of these, with a harsh *chur-r-r-r* at end. Flight song an elaborate outpouring of these same sounds, given above tree-tops with wings and tail flopping.

This bird must be migratory. We did not see it before March 15, nor did the senior author encounter it during his visit in early March of 1938. It is our belief that the Sabinas Valley marks about the northern limit of its range.

CRIMSON-COLLARED GROSBEAK, *Rhodothraupis celaeno.*—Seen daily. Often encountered in clumps of the shrubby nightshade, *Solanum verbascifolium,* on the leaves of which it regularly fed. Singing first heard March 29. Song rich and varied, though less fluid than a Rose-breasted Grosbeak's. Flight song frequently observed. Most characteristic call-note a high, thin squeal, not unlike that of the Broad-winged Hawk, *Buteo platypterus.*

In one of our adult male specimens (April 11) all the tertials, several proximal greater coverts, and one primary of the right wing are green-edged.

GRAY-TAILED CARDINAL, *Richmondena cardinalis canicauda.*—Fairly common. Established on nest-territories at time of our arrival, one pair living in the shrubbery about the house. Parent birds were seen carrying food here during latter April and early May.

Our two male specimens do not agree in size (wing, 90, 86; tail, 103, 93 mm.), but both have a good deal of gray on the back and both are small-billed as compared with *R. c. coccinea.* That Cardinals of southern Tamaulipas do show a tendency toward *coccinea* (as Ridgway long ago pointed out) is clearly shown, however, by the largeness of bill in a specimen in the Cornell University collection taken 70 miles upstream from the mouth of the Tamesi River by Fuertes, April 7, 1910.

ROSE-BREASTED GROSBEAK, *Hedymeles ludovicianus.*—Two males in mixed plumage seen on mountain southwest of Rancho, March 29. Male in breeding plumage seen at base of mountain, April 19.

BLACK-HEADED GROSBEAK, *Hedymeles melanocephalus.*—Noted several times along the Sabinas, March 15–27. Full song heard several times.

WESTERN BLUE GROSBEAK, *Guiraca caerulea interfusa.*—One or two seen daily, April 17–May 2. Two males (testes somewhat enlarged; wing in both specimens 91 mm.) taken by Sutton, April 17. Female (wing, 86 mm.) taken by Lea, May 1.

BRIGHT BLUE BUNTING, *Cyanocompsa parellina lucida.*—Presumably nests in the Gomez Farias region but we did not handle a specimen that was in breeding condition. Singing noted throughout our stay, and some pairs seemed to be established on nest-territories. Five males taken: two parti-colored subadults with comparatively large bills, April 4 and 9; two small-billed adults with slightly greenish cast below, March 24 and 25; average adult, March 27. With the type and three topotypical male *C. p. lucida* before us, we perceive considerable variation in the

color of the under parts. Two are bright blue on the belly as well as on the chest. One is perceptibly more purplish-blue throughout. All agree in being small-billed and much brighter blue below than *C. p. parellina.*

INDIGO BUNTING, *Passerina cyanea.*—Flocks of fifty or more seen repeatedly along edges of fields. Most birds in mixed feather; many molting. No adult male in completely blue dress seen, and no full song heard. Of five specimens taken, only one (female, April 27) was in complete plumage.

VARIED BUNTING, *Passerina versicolor versicolor.*—Seen several times near the Rancho, March 29–May 2, only two adult males being among these (March 29; April 16). Adult female (ovary somewhat enlarged) and two subadult males (testes about 2 × 3 mm.) taken April 23–28. Full song heard from subadult male, April 28.

EASTERN PAINTED BUNTING, *Passerina ciris ciris.*—Common. Singing heard from April 12 on. Abundance April 27 to May 2 interpreted as migratory wave. Three of our five specimens (March 20–April 29) are, like that collected by Burleigh in 1938, purple-headed adults; one is a richly colored male in first breeding plumage (wing, 67.5 mm.); and one is a pale-throated female. One of the adult males which is a trifle bluer-headed than the others, and the female may, upon further comparison, prove to represent the western race, *P. c. pallidior.*

MEXICAN GRASSQUIT, *Tiaris olivacea pusilla.*—A few pairs noted throughout our stay. Singing male collected March 27 near half-finished nest, about two miles south of the Rancho (Sutton). Breeding male taken in Rio Frio district April 18 (Warner).

DICKCISSEL, *Spiza americana.*—First seen April 15, a single bird (Pettingill). Noted daily near Rancho, April 22 to May 1, usually in small flocks in weed-grown fields. Singing heard from April 27 on. Male (with considerably enlarged testes) taken by Lea, April 27.

TAMAULIPAS ABEILLE'S GROSBEAK, *Hesperiphona abeillii saturata.*—The senior author's party encountered several of these birds in 1938. Upon the three specimens collected that year the description of the present race was based. In 1941, the species was recorded only on March 29, a single male in the top of a tree on the mountain, and a flock of about thirty flying restlessly about (Sutton).

HOUSE FINCH, *Carpodacus mexicanus.*—Bright male seen at Mante, March 12. Dull birds with streaked under parts noted at Rancho twice, March 14 and 29.

SHARPE'S SEEDEATER, *Sporophila torqueola sharpei.*—Noted daily at lower elevations, especially along edges of fields. Singing from definite song-perches heard from May 12 on. Large flocks of molting birds seen in late March and early April, especially along river, where they bathed frequently. Song: *wee-zer, wee-zer, wee-zer, chip, chip, chip, chup, chup, chup, chip-per* (Sutton). Male with much enlarged testes taken March 29 (Lea).

NORTHERN BLUE-BLACK GRASSQUIT, *Volatinia jacarina splendens.*—A few encountered in weed-grown fields and patches of Napier grass from April 27 on. Molting males (testes somewhat enlarged) taken April 29 and 30. To the best of our knowledge these are the northernmost records for the species and genus. Armstrong did not take it at Alta Mira (Richmond, 1896) nor at other points in Tamaulipas (Phillips, 1911).

ARKANSAS GOLDFINCH, *Spinus psaltria psaltria.*—Flocks seen now and then, usually near the river. Two males and a female taken March 21–April 14, and all individuals clearly seen in March and April were molting. A male and a female observed near the Rancho May 1 and 2, appeared to be in complete breeding plumage.

RIDGWAY'S ARREMONOPS, *Arremonops rufivirgatus ridgwayi*.—Full songs heard from March 14 on. Pairs seen going about together from March 22 on. Bird seen with nest-material in bill, April 8. Males taken April 12 and 14 had greatly enlarged testes. Nest with somewhat incubated, pure-white eggs found in *huipilla* thicket April 26 (see Plate 6). These were still unhatched on May 3.

The above-mentioned male specimens are obviously too short-tailed and large-billed for *A. r. rufivirgatus*. One is more buffy on the chest and sides, heavier-billed, and more olive on the back than the other, but both compare favorably with the type of *ridgwayi*. They measure: wing, 64, 61 mm.; tail, 63, 61; exposed culmen, 14.5, 13.

WESTERN GRASSHOPPER SPARROW, *Ammodramus savannarum perpallidus*.—What we took to be Grasshopper Sparrows were seen in a field north of the Rancho buildings several times during mid- and latter April. A female taken there by Sutton, April 29, has been identified as *perpallidus*, though its measurements (wing, 60.5 mm.; tail, 45) fall between those of eastern and western United States birds; its bill is only a little more slender than that of a female *A. s. pratensis* in first-winter plumage taken at Ithaca, New York, October 23, 1938 (Cornell University collection no. 10170); and the darkness of its back indicates an approach to *pratensis*.

WESTERN VESPER SPARROW, *Pooecetes gramineus confinis*.—One to six birds noted in opener country about Rancho, April 16–May 2. Male of present race (wing, 83 mm.; tail, 67) in worn plumage taken April 16 (Warner).

WESTERN LARK SPARROW, *Chondestes grammacus strigatus*.—Noted daily near Rancho, April 3–May 2, in flocks of forty to sixty individuals. The only specimen taken, a female (April 3, Pettingill), is considerably worn, but the back-streaking is obviously narrow.

WESTERN CHIPPING SPARROW, *Spizella passerina arizonae*.—Noted infrequently, March 12–May 2. Male in winter plumage (molting slightly about head) taken from flock of six, March 24 (Warner). This specimen measures: wing, 73 mm.; tail, 62.

CLAY-COLORED SPARROW, *Spizella pallida*.—Seen daily in small flocks March 19–May 3, in weed-grown fields. Two males taken by Pettingill (March 23, April 16) were molting about the head.

EASTERN LINCOLN'S SPARROW, *Melospiza lincolni lincolni*.—The Lincoln's Sparrow is probably a fairly common winter bird of the region though we recorded it only infrequently. Two of three specimens taken in 1941 (female, March 21; female, May 1) have been identified by Dr. Alden H. Miller as *M. l. lincolni*. They measure: wing, 59.5, 59; tail, 59, 55 mm.

ROCKY MOUNTAIN LINCOLN'S SPARROW, *Melospiza lincolni alticola*.—Dr. Miller, who has compared all our Gomez Farias Lincoln's Sparrows directly with the type of *M. l. alticola*, considers a female taken there by Burleigh on March 1, 1938 (Sutton and Burleigh, 1939: 46) and a male (?) taken by Lea April 11, 1941, to be of this race. They measure, respectively: wing, 64.5, 64; tail, 59, 65 mm.

LITERATURE CITED

BENT, ARTHUR CLEVELAND

1940. Life histories of North American cuckoos, goatsuckers, hummingbirds, and their allies. Bull. U. S. Nat. Mus., no. 176: 1–506.

GRISCOM, LUDLOW, AND CROSBY, MAUNSELL S.

1926. Birds of the Brownsville region, southern Texas. Auk, 43: 18–36 (part).

HELLMAYR, CHARLES E.

1935. Catalogue of birds of the Americas. Pt. 8. Zool. Series Field Mus. Nat. Hist., publ. 347: 1–541.

PAGE, JOHN L.

1929. The climate of Mexico. Monthly Weather Review, U. S. Dept. Agriculture, Weather Bureau, Supplement no. 33: 11–29.

PETERS, JAMES LEE

1931. Check-list of birds of the world, 1: 1–345.

1940. The same, 4: 1–291.

PHILLIPS, JOHN C.

1911. A year's collecting in the State of Tamaulipas, Mexico. Auk, 28: 67–89.

RICHMOND, CHARLES W.

1896. Partial list of birds collected at Alta Mira, Mexico, by Mr. Frank B. Armstrong. Proc. U. S. Nat. Mus., 18: 627–632.

SMITH, HOBART M.

1940. An analysis of the biotic provinces of Mexico, as indicated by the distribution of the lizards of the genus *Sceloporus*. Anales de la Escuela Nacional de Ciencias Biologicas [of Mexico], 2: 95–102 (with map).

SUTTON, GEORGE MIKSCH, AND BURLEIGH, THOMAS D.

1939. A list of birds observed on the 1938 Semple Expedition to northeastern Mexico. Louisiana State Univ. Mus. of Zool., Occas. Paper no. 3: 1–46.

1940. Birds of Tamazunchale, San Luis Potosí. Wilson Bull., 52: 221–233.

VAN ROSSEM, ADRIAAN J.

1931. Report on a collection of land birds from Sonora, Mexico. Trans. San Diego Soc. Nat. Hist., 6: 239–303.

Cornell University, Ithaca, New York
and
Carleton College, Northfield, Minnesota

BIRDS OF THE GREAT SALT LAKE ISLANDS

BY WILLIAM H. MARSHALL AND LYNDON J. LEATHAM

THE nesting colonies of birds on the islands of Great Salt Lake, Utah, are justly famous and have received considerable ornithological attention. Such publications as those of Behle (1935), Woodbury and Behle (1933), Palmer (1916), and Cottam and Williams (1939), deal almost exclusively with these rookeries. Little has been published on non-colonial birds of the islands since Ridgway (1877) visited certain of them in 1869.

During the summer of 1938, field work for the U. S. Bureau of Biological Survey provided an opportunity to obtain notes on birds of all the islands. Although the lists differ little from those for the mainland, they are of interest from several points of view, as for comparison with Ridgway's lists of 1869, for the complete counts of individuals on certain small islands, and for the correlation of bird occurrences with certain habitats. Most of the notes represent sight records, though, as indicated in the lists, all birds of doubtful field identification were collected.

Acknowledgments are due to Dr. D. I. Rasmussen, of the Biological Survey, and to Lee Kay, Utah Fish and Game Commission, for initiating the senior author's interest in the islands on the annual bird-colony census of 1937, when Bird and Gunnison Islands were visited; to Professor T. C. Adams, of the University of Utah, who provided the data on acreages of the islands; and to A. D. Smith, of Utah State Agricultural College, who identified many of the plants found. Specimens prepared, as indicated in the lists, were identified by Drs. H. C. Oberholser and Clarence Cottam in Washington, D. C.

Text-figure 1 indicates the places and dates at which observations were made. Work in the field out of camp usually amounted to at least eight hours, and, of course, all daylight hours spent in camp provided some opportunities for taking notes. Marshall visited all the islands except Gunnison in 1938, and was on that island in 1937. Leatham was on Stansbury, Carrington, and Bird Islands. E. O. Chatelain and R. J. Jansen, undergraduate students at Utah State College, were on Dolphin and Fremont Islands, respectively.

A brief discussion of the islands as bird habitats may be of value in presenting the situation. It must be clearly stated that Gunnison is the only area that has been an island, in a strict sense of the word, continuously since 1850 (Adams, 1938). This fact is probably of small significance, however, to birds other than colonial nesters.

The habitats agree somewhat with those discussed by Linsdale (1938). The geologic basis of these, obvious in the field, suggests the following designations that are used in the text.

(1) *Sand bars:*—fringes of sand deposited around each island to

TEXT-FIG. 1.—Map of Great Salt Lake, Utah.

the height of about fifteen feet above the salt flats. These are water deposits of recent years. The abundant plants are *Sarcobatus vermiculatus* and *Atriplex confertifolia,* with *Chrysothamnus nauseosus, Oryzopsis hymenoides, Artemisia spinescens, Distichlis stricta,* and *Dondia* spp. also found in scattered spots. One area of high and apparently wind-deposited sands on Stansbury supported a grove of *Juniperus utahensis.*

(2) *Benchlands* (Gilbert, 1890):—gravel deposits at various levels of ancient lakes that support chiefly *Artemisia tridentata* and (or) *Bromus tectorum,* although a wide variety of other plants also occurs; from indications on Carrington Island such bunch grasses as *Oryzopsis hymenoides, Stipa comata,* and *Agropyron spicatum* may have been more abundant before recent fires and heavy winter use by domestic sheep.

(3) *Original islands:*—areas on Stansbury and Antelope Islands that were above the highest level of Lake Bonneville. These areas support extensive groves of the mountain mahoganies (*Cercocarpus montanus* and *C. ledifolius*) as well as some *Juniperus utahensis* and a few *Pseudotsuga taxifolia* (one small ravine on Stansbury). *Rhus trilobata, Agropyron spicatum,* and *Astragalus* spp. were also common on the highest areas.

(4) *Springs:*—fresh-water springs are found only on Antelope Island, where *Acer negundo, Populus nigra* var. *italica, Salix* spp., and a five-acre field of alfalfa are maintained by irrigation. This is the only permanent human habitation on the islands, and was used as a base by Ridgway in 1869, as well as by the senior author in 1938. *Acer glabrum, Salix* spp., *Rumex crispus, Urtica* spp., and other plants grow in the non-utilized spring areas. Brackish springs on the shores of Antelope, Stansbury, and Fremont Islands support dense growths of *Distichlis stricta* and *Scirpus paludosus.*

Antelope Island is the only one having all of these habitats; Stansbury and Fremont lack fresh-water springs; Carrington until recent years had a brackish spring, but now, like Dolphin, Gunnison, and Bird Islands, it has only sand bars and benchlands.

Badger Island (as locally known) is merely a large sand bar about midway between Carrington and Stansbury Islands.

Both the original islands and benchland areas have cliffs and talus slopes that are of significance to bird life.

For convenience, bird lists by islands, with comments where significant, will be presented. For the small islands, the total numbers of birds are estimated but no quantitative data were obtained for the larger islands.

DOLPHIN ISLAND

This northernmost and probably driest island is about fifty acres in extent. It was visited June 4 to 6, 1938.

PACIFIC NIGHTHAWK, *Chordeiles minor hesperis.*—Two birds were seen over the island in the evening. They might easily have come from the mainland, though there was suitable nesting habitat on the island.

AMERICAN RAVEN, *Corvus corax sinuatus.*—One dried-up body of an immature bird was found on the sand bar.

UTAH HORNED LARK, *Otocoris a. utahensis.*—A nest of four eggs was found in *Distichlis stricta,* and from six to eight adults were often seen feeding about the sand bars of the island.

SAGE THRASHER, *Oreoscoptes montanus.*—One pair with a nest (four eggs) in an *Atriplex confertifolia* bush was observed.

DESERT SPARROW, *Amphispiza b. deserticola.*—Two pairs noted in *Atriplex confertifolia.*

BREWER'S SPARROW, *Spizella b. breweri.*—Two or three breeding pairs were on the island, nearly always seen in *Atriplex confertifolia.*

On this small island, which was completely covered during two days, we found the following nesting densities.

TABLE 1

Species and number of nests	*Total acres per nest*[2]	*Acreage of nesting cover*[1]	*Acres per nest*[2]	*Acreage of feeding cover*[1]	*Acres per nest*[2]
Horned Lark 2	25	Distichlis ¼	⅛	Distichlis and flats 100	50
Sage Thrasher 1	50	Atriplex 5	2.5	Brushy 40	40
Desert Sparrow 2	50	Atriplex 5	2.5	Brushy 40	40
Brewer's Sparrow 3	16	Atriplex 5	1.6	Brushy 40	13

[1] Authors' estimates based on observations of nesting and feeding activities of this species on all islands.

[2] Result of dividing number of nests into estimated acreages.

GUNNISON ISLAND

While Dr. D. I. Rasmussen, Lee Kay, and the senior author were on this island on June 23, 1937, one family of Rock Wrens, *Salpinctes o. obsoletus,* was observed, and one pair of Prairie Falcons, *Falco mexicanus,* was noted.

On June 18 to 19, 1935, Dr. Rasmussen found two Prairie Falcons' (*Falco mexicanus*) nests and several pairs of Rock Wrens (*Salpinctes o. obsoletus*) which may be considered nesting birds. In addition seven American Ravens (*Corvus c. sinuatus*) and a small flock of Black-necked Stilts (*Himantopus mexicanus*) visited the island.

Dr. Alfred M. Bailey, Director of the Colorado Museum of Natural History, Denver, Colorado, has very kindly made available to the authors the following additional notes on the bird life of this island.

On May 28, 1937:

AMERICAN RAVEN, *Corvus corax sinuatus*.—A nest with five young found.
YELLOW-HEADED BLACKBIRD, *Xanthocephalus xanthocephalus*.—Six females observed.
COWBIRD, *Molothrus ater subsp.*—One pair observed.

On June 8, 1937:

(?) WRIGHT'S FLYCATCHER, *Empidonax wrighti*.—One pair collected.
BLACK-HEADED GROSBEAK, *Hedymeles melanocephalus papago*.—A female bird collected.
EASTERN YELLOW WARBLER, *Dendroica aestiva aestiva*.—One female collected.
WESTERN CHIPPING SPARROW, *Spizella passerina arizonae*.—One female collected.

Dr. Bailey's expedition was on this island during a very stormy period which may well explain the occurrence of these species on this, the most desert-like of the islands.

BIRD ISLAND

Area twenty-two acres; visited in the evening of June 30, 1938. One Prairie Falcon (*Falco mexicanus*) in the air and five Utah Horned Larks (*Otocoris a. utahensis*) on the sand bar to the south were seen. It is probable that the falcon was the same one seen on Carrington Island, and that the larks were visitors also. There is little, if any, suitable nesting area for these birds on this tiny island as the pelican, gull and heron colony utilizes most of the acreage.

CARRINGTON ISLAND

Carrington Island, with an area of 1,740 acres, was visited from June 29 to July 2, 1938, with the exception of the evening of June 30. The entire island was well covered during this period.

WESTERN RED-TAILED HAWK, *Buteo borealis calurus*.
MARSH HAWK, *Circus hudsonius*.
PRAIRIE FALCON, *Falco mexicanus*.
One individual of each of these birds was noted, but no hawk nest was found.
WESTERN MOURNING DOVE, *Zenaidura macroura marginella*.—Four mourning doves were seen.
SHORT-EARED OWL, *Asio f. flammeus*.—Two birds were often seen foraging during the evenings. They may well have nested on the island.
NUTTALL'S POOR-WILL, *Phalaenoptilus n. nuttalli*.—One bird was seen and collected.
UTAH HORNED LARK, *Otocoris a. utahensis*.—These birds were frequently seen on the sand bars; at least several families were represented.
ROCK WREN, *Salpinctes o. obsoletus*.—One pair was observed among the rocks at the west side of the island.

WESTERN MOCKINGBIRD, *Mimus polyglottos leucopterus*.—One family group of seven or eight birds was noted feeding over the *Sarcobatus* areas on the sand bars of this island.

SAGE THRASHER, *Oreoscoptes montanus*.—Two nests (containing four and five eggs) were found in *Sarcobatus* bushes. Several other pairs were noted.

CALIFORNIA SHRIKE, *Lanius ludovicianus gambeli*.—One family group of five was seen.

DESERT SPARROW, *Amphispiza b. deserticola*.—Common.

BREWER'S SPARROW, *Spizella b. breweri*.—Abundant in the *Artemisia* areas.

It is of interest that members of Ridgway's party (Ridgway, 1877: 371) visited this island on June 17, 1869. They brought back eggs of Avocet, Canada Goose, and California Gulls and reported "various other waterfowl as breeding upon this island and a smaller one near by." According to sheepmen a spring flowed upon this island until 1925.

BADGER ISLAND

Badger Island is the local name for a sand bar about six acres in extent that lies midway between Carrington and Stansbury Islands. Its chief ornithological interest is as being the site of a previously unreported nesting colony of Treganza's Heron (*Ardea h. treganzai*). During the years 1871 to 1873 this bar was probably under water. From 1874 to 1902 and from 1907 to 1931, it has been surrounded by salt water. Two groups of heron nest platforms were found. One, numbering 105, was in a good state of preservation; while six obviously older platforms were found a short distance away. Sheepmen reported that herons and gulls nested here in the 1920's. It is thought that the well-preserved group of platforms represents this period, while the older group may be nests of the earlier period, 1879–1902. There were no occupied nests of herons or gulls on this island in 1938.

Birds noted here on the evening of June 29 and the early morning of June 30 were:

SHORT-EARED OWL, *Asio f. flammeus*.—One bird foraging over the entire island.

SAGE THRASHER, *Oreoscoptes montanus*.—Three birds noted, representing apparently two pairs at opposite ends of the island.

DESERT SPARROW, *Amphispiza b. deserticola*.—Nine adult birds noted, which may well have represented four or five nests on the area.

BREWER'S SPARROW, *Spizella b. breweri*.—About twenty birds noted, which apparently represented several 'family' groups.

On this island with an estimated five acres of exceptionally high and dense bushes of *Sarcobatus vermiculatus* and *Atriplex confertifolia* two pairs of Sage Thrashers, four or five pairs of Desert Sparrows, and probably four pairs of Brewer's Sparrows were found.

Thus a nesting density of 1 to 2.5 acres, 1 to 1 acre, and 1 to 1.25 acres respectively is recorded. These estimates coincide closely with those for Dolphin when the suitable nesting cover is considered (Table 1). The use of the feeding area is much more intense, possibly because the plant growth is much more dense on Badger Island.

STANSBURY ISLAND

Intensive field work from June 20 to 26, 1938, was carried on at the south and north ends of this large (19,305 acres) island. The lists are divided by 'habitats,' since these were apparently significant, although, of course, some birds overlapped.

Sand Bars

UTAH HORNED LARK, *Otocoris a. utahensis.*—Common; one bird collected.

WESTERN MOCKINGBIRD, *Mimus polyglottos leucopterus.*—One bird was seen a few times and frequently heard near the camp.

CALIFORNIA SHRIKE, *Lanius l. gambeli.*—One family of four young and two adults fed for two or three days near the camp. Two specimens were taken. This species and the mockingbird were seen only in the small grove of *Juniperus* at the north end of the island.

Benchlands

WESTERN MOURNING DOVE, *Zenaidura macroura marginella.*—Common.

PACIFIC NIGHTHAWK, *Chordeiles minor hesperis.*—One nest with two eggs was found under an *Artemisia tridentata* bush. The adults were commonly seen in the evenings.

AMERICAN RAVEN, *Corvus corax sinuatus.*—A few adult birds were observed.

SAGE THRASHER, *Oreoscoptes montanus.*—Common in the *Artemisia* areas.

WESTERN MEADOWLARK, *Sturnella neglecta.*—Common in the *Artemisia* areas.

WESTERN LARK SPARROW, *Chondestes grammacus strigatus.*—Rare in *Artemisia* areas; one bird was collected.

DESERT SPARROW, *Amphispiza bilineata deserticola.*—Common in the *Artemisia* areas.

BREWER'S SPARROW, *Spizella b. breweri.*—One bird collected; this species was abundant in the *Artemisia* areas.

'Original Islands'

WESTERN RED-TAILED HAWK, *Buteo borealis calurus.*—One pair of adults was observed at the north end of the island, where an old nest was found in a juniper tree.

PRAIRIE FALCON, *Falco mexicanus.*—A nest of these birds with young was found on the face of an inaccessible cliff at the north end of the island. An adult, which dropped a recently killed ground squirrel (*Citellus townsendi mollis*), was flushed on the south end of the island.

NUTTALL'S POOR-WILL, *Phalaenoptilus n. nuttalli.*—One bird seen and heard at dusk on the north end of the island.

ROCK WREN, *Salpinctes o. obsoletus.*—Common.

ASH-THROATED FLYCATCHER, *Myiarchus c. cinerascens.*—Several adults seen and one specimen taken.

WESTERN GNATCATCHER, *Polioptila c. amoenissima.*—One family group seen and one bird collected.

MONTANA TOWHEE, *Pipilo maculatus montanus.*—One nesting pair was noted of which a specimen was taken.

HOUSE FINCH, *Carpodacus mexicanus frontalis.*—One adult bird was seen several times.

Brackish Springs

An interesting activity of the California Gull (*Larus californicus*) was noted at the large brackish spring on the northeast shore of the island. Throughout daylight there was a more or less continuous stream of birds going both north and south along the east shore, apparently to and from the nesting colony of Bird Island and the mainland. Many of them used these springs for a watering place; there were usually about one hundred and fifty birds on the water drinking, and individuals were flying in and out of the area almost constantly. About fifteen hundred birds rested on a nearby sand spit for most of the day. One Marsh Hawk (*Circus hudsonius*) was seen foraging over these springs.

Two earlier records of birds on this island have been found: Ridgway on June 12, 1869, reported the Catbird, *Galeoscoptes* (now *Dumetella*) *carolinensis*, and Stansbury (1852) mentions hearing the song of the Mockingbird.

FREMONT ISLAND

Captain John C. Fremont (1850) writes briefly of the birds seen on this island in September 1843, stating (p. 206) "a magpie and one larger bird . . . were the only living things" seen on the island. This apparently comprises the first recorded observation of animal life on any of the islands. The men in the party had dreamed of a game paradise on these isolated areas and were so bitterly disheartened that they named it Disappointment Island.

This island, with an area of 2,940 acres, was visited August 6 and 7, 1938, when only the western half was covered.

Sand Bars

MARSH HAWK, *Circus hudsonius.*—Five individuals were seen hunting over the extensive bar area at the west end of the island. These apparently were one adult female and four young.

SHORT-EARED OWL, *Asio f. flammeus.*—One bird was noted several times hunting over the same area.

UTAH HORNED LARK, *Otocoris a. utahensis.*—One group of seven birds was observed at the western extremity.

Benchlands

PRAIRIE FALCON, *Falco mexicanus.*—A recently used nest was found in the low cliffs at the north end of the island. One adult bird was seen.

MONTANA HORNED OWL, *Bubo virginianus occidentalis*.—One individual was flushed several times from the low cliffs on the north side of the island.

PACIFIC NIGHTHAWK, *Chordeiles minor hesperis*.—At least four adults were seen flying over the western extremity of the island.

ROCK WREN, *Salpinctes o. obsoletus*.—Two small groups of these birds were observed along the rocky cliffs of the north shore.

CALIFORNIA SHRIKE, *Lanius l. gambeli*.—One group of five birds, four immature, was noted in the sagebrush areas.

BREWER'S SPARROW, *Spizella b. breweri*.—Common in the *Artemisia* areas.

ANTELOPE ISLAND

This large island, area 26,056 acres, has the only fresh water and human habitation of all the group. It is particularly interesting because of the field work by Ridgway on June 4 to 8, 1869. He stayed at the ranch which was built in early pioneer times, the original buildings of which are still in use. Through the courtesy of John R. Dooley, of Salt Lake City, the same buildings were used as a base in 1938, from July 12 through July 14.

Ridgway (1877: 370) used nearly identical phrases to describe habitats as are used in the present paper. Hence the lists are directly comparable. A combination of the current lists for Stansbury and Antelope Islands duplicates the list of sixty-nine years ago except for two habitats, as pointed out later.

Sand Bars

Little time was spent in this habitat except at two previously unreported California Gull colonies, which as noted at Bird Island, are not suitable for passerine birds. One of the colonies, at the end of a sand bar about a mile north of the ranch, had an estimated 1,500 young. The other, at the south end of the island, contained approximately 300 young.

Benchlands

BLACK-CROWNED NIGHT HERON, *Nycticorax n. hoactli*.—One immature bird with a flock of California Gulls feeding on grasshoppers.

WESTERN RED-TAILED HAWK, *Buteo borealis calurus*.—Two adults seen.

CALIFORNIA GULL, *Larus californicus*.—Several large flocks seen feeding on grasshoppers.

'Original Island'

PRAIRIE FALCON, *Falco mexicanus*.—One adult seen.

AMERICAN RAVEN, *Corvus corax sinuatus*.—Two adults seen.

This list is quite incomplete and probably should be comparable to that for the same habitat on Stansbury Island.

Brackish Springs

KILLDEER, *Oxyechus v. vociferus.*—Common.

SHORT-EARED OWL, *Asio f. flammeus.*—Abundant.

UTAH HORNED LARK, *Otocoris a. utahensis.*—Common.

BREWER'S BLACKBIRD, *Euphagus cyanocephalus.*—One group of six birds seen.

Ridgway recorded observations at the ranch, used as headquarters, separately from the other habitats. Since these notes represent the area of greatest amount of fresh water and plants dependent on it, they were compared with the 1938 list for 'Springs—fresh water' which is as follows:

CALIFORNIA QUAIL, *Lophortyx c. californica.*—One covey seen.

RING-NECKED PHEASANT, *Phasianus c. torquatus.*—Two males noted.

BARN SWALLOW, *Hirundo erythrogaster.*—Abundant.

ENGLISH SPARROW, *Passer d. domesticus.*—Very abundant.

BREWER'S BLACKBIRD, *Euphagus cyanocephalus.*—One small flock seen.

A comparison of the recent lists with those of Ridgway showed three striking points: (a) the number and kinds of waterfowl using the islands have been greatly reduced; i. e., Carrington notes; (b) the species of birds found on the 'original-island' and benchland areas are practically the same; (c) a pronounced reduction of native song-birds such as Warbling Vireo, oriole, Redstart, and Catbird at the ranch headquarters has taken place. In their stead were found an enormous number of English Sparrows that swarmed in large numbers in the shade trees and about buildings.

A comparison of these lists with that of Stanford (1932) indicated that most of the birds seen on the islands have also been reported from areas to the north of the Great Salt Lake. Thus, as far as birds other than those nesting in the rookeries are concerned, the avifauna of the islands is considered as typical of the desert areas of northwestern Utah.

The lack of a permanent fresh-water supply on most of the islands presents an interesting problem as to water requirements of these nesting birds.

Weather Bureau records of ten years, 1911–20 (Alter, 1926), show the following conditions for the nesting season at Midlake (see map, Text-fig. 1).

TABLE 2

	Average monthly precipitation	*Average number days with .01 precipitation or more*	*Average maximum temperature*	*Highest recorded temperature*
April	0.43	2	57.1	78
May	0.38	3	66.1	88
June	0.50	2	76.9	94
July	0.32	2	83.0	92
August	0.09	0	81.6	90

The series of records shows that three times in June, twice in July and four times in August there was no recordable precipitation. Evaporation from an open-water surface has been between 12 and 13 inches during July at the Salt Lake airport. These records, while not directly applicable to all the islands, indicate climatic conditions on the lake in general and Dolphin, Gunnison, Bird, Carrington, and Badger Islands in particular.

Dolphin, Gunnison and Bird Islands are fully fifteen miles from the nearest fresh water during these months; while Carrington and Bird are approximately six miles from the brackish springs of Stansbury Island. Thus these birds nest without a certain supply of fresh water since flights of six and fifteen miles for water are improbable for small passerine species.

SUMMARY

(1) Environmental conditions on the islands in the Great Salt Lake of Utah are presented briefly and lists of birds for each island are discussed in relation to the 'habitats.'

(2) For certain smaller islands complete counts of individuals are presented with data as to nesting densities.

(3) One previously unreported Treganza's Heron colony and two recently established California Gull colonies are noted as well as the possible water supply for the large California Gull colony of Bird Island.

(4) Comparison of lists with those of Ridgway for sixty years previous indicates the deleterious effect of recent droughts and of the introduction of exotics upon birds of Carrington and Antelope Islands, although the lists of birds not directly dependent on fresh-water springs are practically identical.

(5) Lists of non-colonial nesting birds are identical with those for northwestern Utah, except for being less varied.

(6) The severity of water conditions on the small isolated islands indicates the tolerance of certain desert species to lack of water during the nesting and brooding season.

LITERATURE CITED

ADAMS, C. T.
1938. Personal letter on topographical data, August 24.

ALTER, J. C.
1926. Summary of climatological data for the U. S. by sections. U. S. Dept. Agr., Weather Bureau Section 11, Western Utah, 1911–20.

BEHLE, W. H.
1935. A history of the bird colonies of the Great Salt Lake. Condor, 37: 24–35, map.

COTTAM, C. E., AND WILLIAMS, C. S.
1939. Food and habits of some birds nesting on islands in the Great Salt Lake. Wilson Bull., 51 (3): 150–155.

FREMONT, J. C.
1850. The exploring expedition into the Rocky Mountains, Oregon, and California. Derby & Co., Buffalo, New York, 456 pp.

GILBERT, G. K.
1890. Lake Bonneville. Monogr. U. S. Geol. Surv., 1: 1–425, illus.

LINSDALE, J. S.
1938. Environmental responses of vertebrates in the Great Basin. Amer. Midland Nat., 19 (1): 1–206.

PALMER, R. H.
1916. A visit to Hat and Egg Island, Great Salt Lake. Condor, 18: 113–123, 5 figs.

RIDGWAY, R.
1877. Ornithology, in 'Ornithology and Palaeontology,' U. S. Geol. Expl. Fortieth Parallel, 4, pt. 3, pp. 303–669.

STANFORD, J. S.
1932. Birds of the desert, marsh, field, and mountains in northern Utah. Proc. Utah Acad. Sci., 9: 71–77.

STANSBURY, H.
1852. Exploration and survey of the valley of the Great Salt Lake of Utah. Lippincott, Grambe and Co., Philadelphia, 487 pp., 23 plates, 35 figs., and 2 maps.

WOODBURY, R. M., AND BEHLE, W. H.
1933. The bird rookeries of the islands of Great Salt Lake. Proc. Utah Acad. Sci., 10: 165.

Fish and Wildlife Service
Boise, Idaho
and
Utah State Agricultural College
Logan, Utah

MIGRATION IN PACIFIC COAST WHITE-CROWNED SPARROWS

BY BARBARA D. BLANCHARD

THE PROBLEM

THE groundwork for the present paper was laid by five years' intensive study of the annual cycle of two extreme local populations of Pacific coast White-crowned Sparrows (*Zonotrichia leucophrys*), those of latitude 37–38° north and 49° north, that is, of Berkeley, California, and Friday Harbor, Washington. Owing to the false effect of the trinomial, which pretends to segregate a mass of creatures neither identical nor delimitable as a rigid geographic unit, it is nearly impossible in the course of the present discussion to keep clear of the vicious concept of two unified and unlike aggregates, represented by the subspecific names *nuttalli* and *pugetensis*. Actually most of the research referred not to two *halves* of the *nuttalli-pugetensis* population, but to the two extreme populations. The Berkeley population is permanently resident, the Friday Harbor population is strongly migratory, wintering probably in central or southern California. This work is discussed at length in a previous paper (Blanchard, 1941). The results are briefly summarized here.

Color-banding, watching, collecting, and histological studies of Berkeley residents and wintering migrants (the latter almost certainly represent breeding birds from the northern extreme of the range) revealed the sharpest contrasts between the two populations in behavior and in physiology. The adult Berkeley residents stay permanently paired on territories; the immatures flock in fall and winter but begin in January to mate and to carve out territories. Recrudescence of the gonads begins in late December and breeding condition is reached between early and late March, depending upon the year. The prenuptial molt is meager, and the birds never acquire more than a little fat. Migrants wintering on the same ground present the sharpest contrasts in all these respects. Both adults and immatures arrive in September in huge flocks, the unity of which is maintained up to departure the following spring. Recrudescence of the gonads begins later, and by mid-April, when migration occurs, the gonads average only about one-twentieth breeding size and are correspondingly undeveloped as to histologic condition. The prenuptial molt is extensive, and large amounts of fat are laid on prior

to spring migration. The song patterns of the two aggregates are quite distinct.

Behavior of the migrants on their breeding grounds at Friday Harbor offered further contrasts to that of the resident Berkeley population. The battle for territory and mates began on the day of arrival and was waged fiercely for three weeks, up to the beginning of incubation. Among the southern residents territorial disputes, while occupying about the same interval of time, are begun much earlier in relation to the stage of the gonad cycle, and stop some 6.5 to 8.5 weeks before incubation.

The whole breeding period of the northern birds, from day of arrival until fledging of the third brood, occupied less than four months, whereas the Berkeley birds consumed 6 to 6.5 months to achieve the same fraction of the cycle. The average clutch size in the northern population was 4.09 eggs, that of the southern, 3.25.

As to morphology, on the other hand, migrants and residents are so closely similar as to be indistinguishable on the basis of quantitative characters. The only difference, perceptible only in individuals at the extremes of large series, is a slightly darker tone in the rump patch of the southern breeding birds.

Between these two extremes, then, migration of a thousand miles changes to permanent residence. The time of breeding changes by six weeks. The length of the breeding period changes by nine weeks. The average clutch size changes by one-fourth to one-fifth. The manner, as well as the time, of molt, change radically; sudden and heavy seasonal assumption of fat appears and disappears. The song pattern changes in a variety of ways. Least important of all, probably wholly without practical application to the birds' lives, a faint change in color takes place. Finally, these several transitions occur, not *pari passu,* but more or less independently.

To establish, over 1500 miles of coastline, and stage by stage, the nature of each of these changes, would be the work of a lifetime for many investigators and is of course out of the question for the present. Yet, if the picture which the data tempt us to draw, of the modification of all these habits in correlation with the Recent cycle of the environment, is to be substantiated, then it is necessary to understand to some degree the nature of the transition from one set of habits to the other: whether, for instance, there exists any abrupt break, such as might suggest the present interface of two independently established and only recently confluent populations, or whether the transition is so gradual as to occur parallel with the

very gradual present, or the undoubtedly less-gradual Pleistocene, transformation of the environment from north to south.

A few fragments of information were available for an intermediate segment of the White-crown range, that between latitudes 41° north and 45° north (between Eureka, California, and Tillamook, Oregon). From banding data and previous field work, I knew the birds to be absent from Tillamook in winter and present the year round at Eureka and therefore that somewhere within this four-hundred miles of coast, migration must stop and residence begin. In December 1937, Dr. Mary Erickson and I spent three weeks in this intermediate zone, and established Myrtle Point, Oregon, as the northern limit of the winter range. North of this point White-crowns were totally absent; south from Myrtle Point to Crescent City we found only small scattered flocks. As we continued south these gradually increased in size and numbers until in the Eureka region we found large flocks of thirty to fifty birds, which congregated in roadside brush along the edges of open fields while suitable adjacent breeding ground, where two years before I had collected nesting birds, stood empty. Whether these flocks were composed solely of migrants from more-northern breeding grounds, or of residents which had left their local territories, or of both, was the next problem which had to be solved, and for which there was almost no concrete evidence available. From purely theoretical considerations, however, it seemed likely that in this intermediate area close to the northern limit of year-round residence, the migratory instinct would be weaker, less regular, than at the northern extreme of the range, and therefore that these marginal birds, if migrants, would have bred in latitudes not far north of Eureka. That is to say, in these intermediate populations the habit of migration would pass very gradually into permanent residence, as a shade might pass into white, with no hint of an abrupt change from one fully developed set of habits to the other.

Since the migratory habit is the most spectacular of all the various changes, most of which appear to be more or less subservient to it, and since I had ventured, in my first paper, to hypothecate the nature of this transition, it seemed most important to work in the area where migration and residence appeared and disappeared, respectively, to find out whether this was abrupt or gradual, regular or irregular, and whether a uniform change of all these major habits took place on the same ground.

Of broader application than the mere light which might be thrown upon the differentiation in habits and physiology of the two races in

question, lay the possibility that in working out, stage by stage, from zero to one hundred per cent, the nature of the appearance, strengthening and regularizing of the habit of migration in successive fractions of this one species, one might unconsciously be working out the history of migration itself. Furthermore, if such a phenomenon is visibly coming into being or disappearing today, and if its correlation with obvious factors in the environment is evident, then such factors and circumstances may reasonably be considered as at least among those responsible for the rise of migration among birds.

HUMBOLDT COUNTY

It was for the reasons just stated that I returned to the northwest coast this spring (1939) at certain points intermediate between Eureka, California, and Tillamook, Oregon, color-banding, watching, and collecting. From banding data and previous field work I knew the birds to be absent from Tillamook in winter and present the year round at Eureka. Furthermore, I was shortly to prove that some members of the wintering Eureka flocks were resident and therefore that somewhere within this four hundred miles of coast, migration must stop and residence begin.

On my arrival in the Eureka region on March 15, I found a few birds already established on territories, but the vast majority were still integral parts of huge winter flocks. Both groups had undoubtedly spent the winter there, since spring migration, as recorded by departure dates at Berkeley and arrival dates at Tillamook and Friday Harbor, was not to begin until two or three weeks later. I spent ten days in the field, banded 55 birds, collected and preserved for microtechnical analysis 55 specimens, and spent 100 hours watching both banded and unbanded birds.

This brought to light the general fact that, instead of the two clearly defined groups, each with its great uniformity of behavior, song pattern, gonad condition, and fat, that I had left at Berkeley, or the single very uniform group I had watched arrive at Friday Harbor, there existed at this middle point the utmost confusion in all these respects. The transition was intergradational and gradual indeed,—certainly there was no question of one population ending abruptly and another beginning, as if divided by a wall. But the intergradation was not passing smoothly and uniformly from stage to stage with population after population, as a shadow might pass gradually into white, but by an irregular jumbling of marginal individuals which showed one tendency or the other in highly variable degrees.

That is to say, instead of two cleanly divided populations typical of resident or migrant condition and behavior, one paired on territories, with large gonads and no fat (like Berkeley *nuttalli* at this date), the other flocking, approaching migration, with small gonads and large amounts of fat (like Berkeley *pugetensis*), a single flock contained fat birds and thin birds with all gradations between; a continuous series from birds with small gonads, just beginning recrudescence, to those with rapidly enlarging gonads with spermatids already formed; birds with a song pattern identical with that previously recorded for the local breeding population and birds with song patterns of more northern populations; fat birds, undoubtedly at least submigrants on their wintering grounds (checked over a month) with gonads three times the size reached by wintering migrants at Berkeley; thin birds, which were to leave the flock, take local territory and begin nesting before I returned three weeks later, in other words acting precisely like the wintering *pugetensis* of the south but omitting the migration. Others which, as will be shown, were to breed locally remained flocking up to a gonad enlargement of 40–50 mm.^{3}, a situation perfectly unparalleled in either extreme population.

I spent nine days following March 15, watching, color-banding and collecting, at six stations within about a twenty-square-mile area. Three weeks later I returned, followed up as many of the banded birds as I could find, collected additional specimens and further checked by field observations on the stage of the reproductive cycle reached by the population as a whole.

On my first arrival, I had found the vast majority of White-crowns in flocks of 50 to 75 birds, a few in smaller flocks of 10 to 20, and only rare individuals, alone or paired, already established on territories. With the exception of these last few, the scene was identical with that in mid-winter of 1937, when I had visited the same region. Practically all the suitable breeding ground stood empty, while the birds congregated by roadsides and open fields in large, apparently completely unified flocks, with no trace of territorial jealousy or sexual interest between flock-mates.

It is beyond question that these flocks, as well as the isolated individuals, were not migrants passing through from some more southern wintering ground, but birds which had spent the winter on the spot. The spring migration, watched by Dr. Mary M. Erickson and Mr. T. T. McCabe, at Berkeley, California, by Mr. Alex. Walker, Mr. Reed Ferris and myself at Tillamook, Oregon, and by Mrs. Forrest Fuller at Friday Harbor, Washington, was not to occur until two or three weeks later. Close watching and collecting at

Berkeley revealed most wintering *pugetensis* not fully prepared, physiologically, to migrate until March 31, and no appreciable decrease in numbers until April 7. With the exception of two birds collected by Mr. Alex. Walker on March 18 and 23, respectively, no White-crowns were seen in the Tillamook region by Mr. Walker, Mr. Ferris or myself, working at points 25 miles apart, until March 28; no appreciable increase in numbers occurred until about April 5. No White-crowns were seen at Friday Harbor until April 4.

Since, during my previous visit to the Eureka region in mid-winter, I had found no White-crowns whatsoever established on territories, it seemed highly probable that the isolated pairs and lone males I found there in March had been members of a flock, perhaps up until only a short time before my arrival. This was made more probable by the histories of other birds, to be discussed below, color-banded while still within a flock, which later settled on local territories to breed. That the isolated birds were destined to breed on the spot seemed certain from their behavior toward the ground and toward neighboring landowners, as well as from the identity of their song pattern with that previously recorded for the local breeding population. As will be shown later, this was proved beyond question by the fact that some of them which had been color-banded in mid-March were found beginning to nest at the same spots a month later.

There were no such clues to the identity of the birds still within the flocks. Were they local residents which had quit their territories in fall and not yet returned to them, or sojourning migrants from more northern breeding grounds, or were they a mixture of both? That is to say, were the flocks homogeneous units, composed of breeding populations from a single latitude, that of the Eureka region or of one farther north, or were they heterogeneous, made up of birds from breeding grounds of different latitudes perhaps several hundred miles apart?

Intensive study of a single flock, combined with sampling from other flocks in the same area, seemed most likely to yield an answer. I chose a large flock of about 75 birds near Waddington, 18 miles south of Eureka, color-banded 23 of its members, banded with a single Biological Survey band 16 more, collected and preserved for microtechnical analysis 37 others, and spent the greater part of six days watching the movements of the flock as a whole. In addition, I watched several other smaller flocks and took a few specimens from each.

The Waddington flock was a homogeneous unit: the birds sang,

foraged, perched, and moved about together in perfect unison. But here the uniformity stopped. Analysis of the specimens revealed the utmost confusion as to physiological condition: this single flock contained birds with testes ranging from 2.8 mm.^{3} in volume to 17.2 mm.^{3}, or from the histologic stage of first appearance of primary spermatocytes in synapsis to that of fully formed spermatids; birds with large amounts of fat, with moderate amounts, and with little or none; birds barely beginning the prenuptial molt, birds molting heavily, and birds which had finished. Nor did the factors of gonad size, amount of fat and stage of molt vary together with any constancy. There were thin birds with small gonads, fat birds with small gonads, both fat and thin birds beginning the molt, and thin birds which had completed it.

This diversity in physiologic condition was accompanied by a like diversity in song: some used the pattern of the local breeding population, a few used one identical with that of the Berkeley wintering, and the Friday Harbor breeding, birds; others used patterns which, a few weeks later, I was to hear on the breeding grounds of the Tillamook region.

Birds collected from other, smaller, flocks varied even more widely as to gonad size, from 5.1 mm.^{3} to 61.0 mm.^{3} (or an average of 25.9 mm.^{3} for nine adults), and from 4.6 mm.^{3} to 25.7 mm.^{3} (or an average of 11.4 mm.^{3} for seven immatures). They also varied widely as to stage of molt, but, unlike the Waddington flock, were uniform as to amount of fat and song pattern. None had more than a little fat, and the only song pattern I heard while hunting or watching these flocks was that of the local breeding population. Two birds, using this pattern at the time I shot them, had gonads of 13.5 mm.^{3} and 25.7 mm.^{3}, respectively. Another, trapped where a bird had sung the local song a few minutes before, had gonads of only 8.3 mm.^{3} One other, already paired on a territory, had gonads of 40.0 mm.^{3} Even within a single population, then, if we are justified in using identity of song pattern as a criterion, the individual variation as to stage of reproductive cycle was exceedingly high.

Here was confusion twice confounded. Not only did a single flock contain individuals in all stages of gonad development, molt and fat assumption, but those birds which, for reasons already discussed, presumably belonged to a single breeding population, also showed a remarkably high degree of individual variation. Nor was there any obvious differentiating factor of behavior or physiology which set apart one section from another of this heterogeneous, conglomerate mass which the White-crown population or populations of the Eureka

region presented at this season. This situation contrasted strongly with that I had left at Berkeley, where two sharply sundered populations, set apart by distinct sets of behavioristic and physiologic characters, with no trace of overlap, existed side by side, as effectively separated as if by a space of a thousand miles, but where the condition of the birds within the wintering flocks was extremely uniform, even just before migration.

In spite of this confusion, however, there were a few slender clues to the identity of the birds in the Waddington flock, and, indirectly, to the identity of the wintering population as a whole. The fact that some of the flock used the local song pattern, that the adult males with little or no fat had testes averaging larger (from 3.9 mm.^{3} to 17.2 mm.^{3} or an average of 13.3 mm.^{3} for ten birds) than adult males which were moderately fat or fat (from 2.8 to 6.1 mm.^{3} or an average of 4.8 mm.^{3} for nine birds) and that these thin birds had gonads approaching in size those of the four individuals, already discussed, which were almost certainly local residents, led me to hypothecate that at least that fraction of the Waddington flock were local residents, or at least not true migrants, which had not yet segregated into pairs on territories. Conversely, the fact that some of the flock used song patterns of more northern populations, and that some individuals (the nine adults referred to above) had reached a stage of fat and gonad size almost identical with that reached by Berkeley migrants on the verge of departure, pointed to the presence of sojourning migrants from more northern breeding grounds. That the latter represented breeding populations from several, rather than a single, more northern latitude, seemed probable both from the diversity of song pattern and from the diversity of physiologic conditions present in the single flock. The presence of local residents in the Waddington flock was proved beyond question when, in mid-April, I returned to follow up the birds I had color-banded a month before. The presence of migrants from more northern breeding grounds was also substantiated, by evidence only slightly less direct. When I returned to Waddington in mid-April I found practically all available breeding ground within 400 yards of the flock headquarters occupied by pairs of White-crowns, several of which were color-banded members of the previous flocks, while at the headquarters itself was still a group of 10 to 20 birds, including several color-banded individuals, apparently all that remained of the original flock.

I found 15 of the 24 birds I had color-banded within the flock a month before. Seven were mated and settled on territories within

350 yards of where I had trapped them; eight were nesting at or close by the flock headquarters. One of the males in the first group was mated to a female engaged in nest-building. I collected him and found that he had no fat and that his gonads had reached full breeding size (163 mm.^{3}). The day after I took this male, another, also color-banded, was following this same female about, as if he were mated to her. Another banded bird in this same group, a female mated to an unbanded male, was seen carrying nest material to a point about 250 yards away from where I had trapped her. In addition to these fifteen already mentioned, I found three other birds, banded with only the numbered metal band, within a few hundred yards of the flock area. One was mated to a color-banded bird; two were alone, singing loudly the song of the local population.

In addition to the color-banded male already mentioned, I collected four other adult males from the same places I had previously taken the nine adults, discussed earlier, with testes averaging 25.9 mm.^{3}, which, because of their song pattern, I had judged to be local residents. These four were all thin, with testis volume of 18.1, 58.1, 64.5, and 129.9 mm.^{3}, respectively. This brings the average to 86.9 mm.^{3}, if the color-banded male is included, which is over three times as large as that for the nine thin adults taken at the same spots three weeks earlier.

As for the birds still at the Waddington flock headquarters, I collected three males, and found that they were much fatter, and had testes averaging much smaller than the birds just discussed. One was 'fat' and had gonads only 4.1 mm.^{3} in volume, another was 'very fat,' with gonads 7.4 mm.^{3} in volume, and the third, a color-banded bird, was 'moderately fat,' with gonads 33.5 mm.^{3} in volume. The stage of fat and gonad development reached by the first two coincides almost exactly with that reached by the Berkeley *pugetensis* on the verge of departure. The physiologic condition of the banded male, on the other hand, has no counterpart in migrants wintering at Berkeley, for although it was fat, it was not so fat as the average Puget Sound sparrow about to leave Berkeley, and yet its testes were *over six times as large* as the average for Berkeley *pugetensis* (4.8 mm.^{3}) just prior to spring migration. Nor was it at all likely that this bird was going to breed at Waddington, for it was far behind the average of the local population, both as to behavior with respect to territory and as to gonad development, and furthermore was considerably fatter. The most probable prediction as to the destiny of this bird would be that before settling on a territory it was preparing to make a flight north, but a much shorter flight than that which either of

the two fatter birds with much smaller gonads would make. As in March, I heard several distinct song patterns at Waddington, but now the local pattern was restricted to birds spaced out on territories, the patterns of more northern breeding populations, to individuals still in flocks. It is highly probable, therefore, that most of the latter were not to breed on the spot, and that others of the color-banded birds still at the headquarters, had I collected them, would have turned out to be fat with small gonads.

It is hardly necessary to state that the color-banded birds already established on territories in mid-March were still in precisely the same spots and mated to the same individuals three weeks later. During a few minutes' search I found six out of ten, all within a few yards of where I had trapped them. The four which were paired in March were still with the same mates.

Here on the same spot, then, were birds representing all degrees of development of the migratory instinct, from those which flew less than five hundred yards to those which, I believe, on the basis of fat, gonad size and song pattern, were to fly far north. This contrasts strongly with the situation at Berkeley, where only the two extremes, of year-round residence on territories and migration of a thousand miles or more, are represented. Here, among the local population at Waddington, was 'migration' reduced to its logical minimum,—one might, rather literally, follow up the migratory instinct to its source, a shift of a few yards in the centering of the activities of daily life. Here, at the northern extreme of residence, were the very beginnings, or the last remnants, of the instinct, no longer of life-and-death value, to forsake the breeding ground in fall.

Here also, close to the northern extreme of year-round residence, the local population bridges the transition from flocking to paired isolation at a much later stage in the sexual cycle (at an average gonad size of about 25 mm.^{3}, during the three weeks before nesting) than does the local *nuttalli* population at Berkeley. They form indiscriminate parts of the flocks in winter, while in the southern Nuttall's Sparrows the adults never leave their territories, even in mid-winter, and the first-year birds begin to segregate into pairs on territories at an average gonad size of only 3 mm.^{3}, some eight to twelve weeks before nesting. The only vestige in the Eureka population of the once essential instinct to migrate is flocking for a part of the year.

TILLAMOOK

The nature of the intergradation was fairly evident at Eureka, but this told me nothing very definite as to the relative distances

of the migration. It was obviously cogent that birds geographically nearest to the margin of year-round residence and showing a general breaking down of the uniform cycle of factors associated with migration in the extreme populations, would possess a weaker migratory instinct and might migrate shorter distances. But this remained an hypothesis. As I had already written, barring the evidence from marked birds caught or seen before and after migration, which was impossible to obtain unless by an occasional stroke of amazing luck, I felt that gonad size on arrival at the breeding ground would be the key to the problem. Migrants to Friday Harbor or southern Vancouver Island arrived with male gonads from half to full breeding size. Would the birds arriving at a southern station, such as Tillamook, Oregon, arrive with much smaller gonads, suggesting evidence that, if they had started at the usual range of size, which is so narrow at Berkeley, and only a little wider at Eureka, they had flown a much shorter distance and therefore belonged to the northern wintering populations? This hypothesis found abundant support.

Nine years' banding records of Mr. Reed Ferris of Beaver, Oregon, as well as many years' observations and collecting by Mr. Alex. Walker of Tillamook, Oregon, indicate the absence, with a few rare exceptions, of wintering White-crowns in the Tillamook region. The winter of 1938–39 was no exception. Although both Mr. Ferris and Mr. Walker had kept almost constant watch for White-crowns, they had seen none, with the exception of two lone males, up to my own arrival on March 26. On March 18, Mr. Walker had collected one male, which was in the process of molting, with gonads only 6.8 mm.^{3} in volume, scarcely larger than the average gonad volume (4.88 mm.^{3}) for Berkeley *pugetensis* on the verge of departure. On March 23, he had collected another, also molting, with gonads 6.1 mm.^{3} in volume.

The day of my arrival I searched over about twelve square miles of suitable White-crown country, soon to be populated, but neither saw nor heard a single bird. I selected a dozen stations scattered throughout the area, visited these on the average of once each day during the ensuing two weeks, and, as soon as the influx of White-crowns began, recorded the number of birds at each station and the precise location of their singing posts. So gradual and unspectacular was the influx at this latitude, so widely scattered and inconspicuous the individual birds, that had I not followed some such system I could scarcely have measured the almost imperceptible increase in numbers of breeding birds. It would be difficult to imagine a greater contrast with the spectacular and noisy inrush farther north, at Friday Harbor.

A day's search on March 27 revealed only two lone birds singing

weakly about five miles apart. The next morning I found about six to ten males at a third point, spaced out, singing from conspicuous posts. They were not yet ready to settle on and defend any definite areas, however, for when I frightened them they flew as one bird to a spot several hundred yards away, and did not return the rest of that day. I collected one male from this group, an adult without fat which had completed the prenuptial molt and had gonads 52.9 mm.^{3} in volume, the largest of any I was to collect in the ensuing two weeks. At a fourth station I found a group of about ten White-crowns singing sporadically, not as isolated individuals, but as members of a loosely knit flock. As soon as they spied me, they, too, became silent and sought cover. I found no others that day. The following morning I found this second group in the same spot. None was singing, and all behaved as integral parts of a flock. I collected three males, all of which were molting, and found that all had the brown or partially brown heads of first-year birds, were without fat, and had gonads ranging from only 2.7 mm.^{3} to 14.0 mm.^{3} Four others taken at different points that same day were also molting, had brown crown-feathers, no fat, and gonads ranging from only 2.3 mm.^{3} to 23.2 mm.^{3} A survey of the remaining stations revealed no further increase in numbers of individuals that day.

For the rest of the two weeks the birds continued to straggle in little by little, either alone or in small, loosely knit flocks, until by April 7, I estimated that from half to two-thirds the area of suitable breeding ground had been carved into territories by birds intending to breed there.

During this two-weeks period I collected twenty-one males from stations unoccupied only the day or two previous to the date of capture,—birds which were, therefore, unquestionably new arrivals. I spent about thirty hours watching others whose arrival time I knew within the same narrow limits. That these new arrivals were prospective breeding birds, if not on the spots they first settled, at least on closely adjacent ground, and not birds of passage sojourning *en route* to far-northern breeding grounds, is almost certain. In the first place, all twenty-one males had little or no fat and therefore, if we may judge from the uniformly fat condition reached by all migrants before departure from Berkeley, were not physiologically ready for further flight. Only one 'fat' male, not included in the averages, was collected at Tillamook. Secondly, I color-banded a male on March 31 and, although he shifted his headquarters and singing posts to a point several hundred yards away from where I trapped him, I was able to find him on several occasions in the new area until by April

8 he was singing strongly, pursuing other White-crowns, and giving every indication of intention to establish breeding territory. In the third place there was no hint of a wave of migrants suddenly appearing, passing through for a few days and then disappearing, such as is familiar, to choose a closely allied bird, in *Zonotrichia coronata*.

The two-weeks' watching and collecting at Tillamook brought to light the following contrasts between the nature of the influx there and that at Friday Harbor some 300 miles farther north:

1. The gradualness of the influx at Tillamook as opposed to its suddenness at Friday Harbor.

2. The small average size of the gonads at Tillamook as opposed to the large size at Friday Harbor.

3. The wide individual variation as to gonad size and histologic stage at Tillamook as opposed to the greater uniformity of size and stage at Friday Harbor.

4. The relatively large proportion of birds still in the process of molt at Tillamook in contrast to the absence of molting birds at Friday Harbor.

5. The weakness of the territorial instinct in new arrivals at Tillamook as opposed to its high development in the Friday Harbor birds at the moment of arrival.

6. The identity of the Tillamook song patterns with certain of those in the Eureka region, as opposed to the identity of certain Friday Harbor song patterns with those of wintering birds at Berkeley and points farther south.

Nature of the influx.—At Tillamook the birds straggled in over a period of more than two weeks, by which time only about one-half to two-thirds the available breeding ground was occupied. At Friday Harbor the bulk of the population arrived on the same day.

Average gonad size.—The gonads of twenty-one newly arrived Tillamook males collected from March 28 to April 6 averaged only 19 $mm.^3$ in volume. Those of nine new arrivals at Friday Harbor averaged 55 $mm.^3$

Range of individual variation in gonad size.—Birds belonging to the breeding population of Tillamook ranged from 2.3 $mm.^3$ to 52.9 $mm.^3$ as to gonad volume; or from that stage of histological development where a few primary spermatocytes in synapsis are beginning to appear to that where all cell generations, including a few mature sperms, are present. The gonad volumes of new arrivals at Friday Harbor ranged from 33 $mm.^3$ to 78 $mm.^3$, representing only two consecutive and very similar stages of histologi-

cal development which differ only in the presence or absence of a few mature sperms.

Proportion of molting birds.—Eight of the twenty-one Tillamook males, as well as many others seen in the field, were still molting. None of the Friday Harbor males I collected, to say nothing of the hundreds I watched in the field, showed any sign of molt.

Strength of territorial instinct.—During the first few days after arrival the Tillamook birds showed little or no attachment to any particular piece of ground. Many came in small flocks, which traversed relatively large areas in their daily foraging, and did not break up at least for several days after arrival. Even the males which had spaced out and were singing at frequent intervals would become silent as soon as they saw me, quit their posts with no hint of reluctance, fly straight away for distances of several hundred yards, and never, as long as I followed, try to turn back. Even when I could detect no external cause for fright, they shifted singing posts frequently, and flew distances far exceeding those contained within the average-sized White-crown territory. This shifting was not the orderly patrol of definite points on the periphery of a limited area, but merely the haphazard, seemingly purposeless, movement of a restless animal. I saw very few pursuits and no fights. The only hint of territorial jealousy was the tendency for neighboring males to alternate in song.

On the day of arrival in Friday Harbor, on the other hand, I had been able to find no trace of a flock or fragment of a flock. All males were spaced out, either alone or paired, singing strongly, ready to chase off intruders. Pursuits and fights were common, and the battle for land was fierce and brief. Birds banded a day or so after arrival stayed throughout the summer on the spot where they first settled.

The arrival I watched at Tillamook, then, less than 150 miles from the northern limit of year-round residence, was extremely irregular and haphazard compared with that which I had watched at Friday Harbor, 450 miles from the limit of year-round residence. The competition for territory was far less severe, perhaps partly owing to the smaller numbers of birds to come on any one day, but unquestionably also in correlation with the undeveloped condition of the gonads. The settlement of the land at Tillamook was a much more leisurely affair. The birds, arriving at a relatively early stage of gonad development, had time and to spare to find mates, carve out territories, and learn their boundaries before they would be physiologically ready to breed. The Friday Harbor birds, arriving little more than a week before copulation was to take place, had to settle all these matters in a few days.

Song pattern.—The predominant song pattern at Tillamook was identical with one I had just recorded at Eureka,—not with that of the breeding population but with one used by a small number of individuals, some of which still frequented the flock headquarters when I returned to Waddington in mid-April. As I have already said in the section on Humboldt County, the behavior of these flocking birds indicated they were not destined to breed at Waddington, and were certainly, therefore, going to make at least a short flight north. The predominant song pattern at Friday Harbor, on the other hand, resembled most closely that of wintering flocks at Berkeley and points farther south, although rare individuals at Waddington were heard using a similar song pattern.

If the birds using the Tillamook song pattern left their wintering grounds at approximately the same stage of gonad development as did the Friday Harbor birds, it is obvious that the former must have spent less time in flight. The facts that the gonads of the Tillamook arrivals averaged little larger than the maximum gonad size for Berkeley *pugetensis* on the verge of spring migration, and that a fair proportion arrived before the molt was finished, point to a relatively short flight from wintering to breeding grounds.

The irregularity of arrival time, the wide range of individual variation in gonad size and the rudimentary nature of the territorial instinct, all point to a far less uniform and precise cycle than that of the breeding birds at the northern limit of the range. The identity of song pattern of the Tillamook population with that of birds wintering at Eureka is further evidence of the relative proximity of wintering to breeding grounds.

This is what we should expect to find from purely theoretical considerations, and is what I have hypothecated in the longer paper on the Coast White-crowns now in press. In the birds breeding nearest to the region of transition from year-round residence to migration, the migratory instinct would almost certainly be less highly developed, less regular, than in birds breeding at the northern limit of the range, farthest from the transition area.

CONCLUSION

At Tillamook, 400 miles north of Eureka, the breeding population has become almost completely migratory. Judging from the observations made during the winter of 1937–38 by Dr. Erickson and myself, practically every member must fly at least 150 miles south each fall. Nonetheless, the behavior of the breeding population offers the sharpest contrasts to that of the more northern populations and in

directions which suggest its kinship with and proximity to the marginal flocks of Humboldt County. Thus, while the Eureka birds, as compared with those at Berkeley, are irregular in time of detachment from the flocks or occupation of territory, so the Tillamook birds are irregular in time of arrival and occupation of territory. Just as the Eureka birds tend to linger in stable flocks until their gonads reach several times the size of departing migrants from Berkeley, so the Tillamook birds, even after their brief migratory flight, linger with enlarged gonads and with a wide variation of individual gonad size in flocks before segregating into pairs on their individual territories.

Tillamook birds loiter for days or weeks on their breeding grounds in a condition of slight sexual development. They differ from the Eureka birds in this respect only by the interpolation of a probably brief northern flight. In general, one has the feeling of dealing once more with a section of the Eureka population which has been selected out by the rather unimportant factor of a brief movement but which possesses no other distinction.

In the transition from the constitution of the Eureka flocks and their response to the onset of the reproductive period, to those of the breeding population of Tillamook we see a rather complete picture either of the growth or the subsidence of a single example of bird migration. It is probably impossible, from the evidence of morphology or physiology, to support the contention that such behavior is vestigial rather than incipient. Such support as may be forthcoming must be derived from our slowly growing knowledge of the late Pleistocene environment. That at the northern confines of the range vast environmental changes, in the direction of amelioration, have taken place within, at the most, the biologically brief period of from ten to fifteen thousand years seeems beyond question. That during this period the front of permanent residence may have crept northward and is now passing Eureka is a cogent, but not a necessary, supposition. We know little of the Pleistocene environment of the central and northern California coast, but what evidence there is inclines to minimize post-Pleistocene change. The essential concept is that northern California or southern Oregon, at the center of the range of the species, and lying between the area of comparative Recent uniformity of climate of central California and the great changes of the latitude of the international boundary, is, from an adaptive standpoint, the logical region for the point of equilibrium between migratory and non-migratory behavior, with their many physiological correlates.

ACKNOWLEDGMENTS

Research for this paper was carried on under the Alice Freeman Palmer Fellowship for 1938–39 from Wellesley College.

I should like to thank Mr. Thomas T. McCabe for invaluable advice and suggestions for a plan of attack on this problem, and for criticism of the manuscript.

I should like to thank the Department of Zoology of the University of California for laboratory and library privileges, and the following persons for assistance of the utmost value in the collection of specimens and field data: Dr. Mary M. Erickson, Mr. Reed Ferris, Mrs. Forrest Fuller, and Mr. Alex. Walker.

LITERATURE CITED

BLANCHARD, B. D.

1941. The White-crowned Sparrows (*Zonotrichia leucophrys*) of the Pacific seaboard: environment and annual cycle. Univ. California Publ. in Zool., 46: 1–178, 20 pls., 30 text-figs.

Placer Junior College
Auburn, California

MOURNING DOVE PRODUCTION IN SOUTHWESTERN IOWA[1]

BY H. ELLIOTT MCCLURE

DURING 1938 and 1939, observations were made of the nesting of Mourning Doves, *Zenaidura macroura*, in the vicinity of Lewis, Iowa, to determine dove production in this area. Production is here construed to mean the number of young reared to flying age and leaving the nests. Lewis, Cass County, Iowa, was chosen as the focal point of the observations. Within a radius of five miles of it, fourteen farmyards and five other nesting sites, such as gullies and woods, were selected for convenience of approach. Since the observer had no idea of the abundance or distribution of breeding places of doves in this region, all observation areas were chosen on the basis of variety of cover and ease of approach during bad weather.

The region around Lewis is mainly rolling farmland cut by many gullies, part of which are wooded or brushy. To the west of the town lies the East Nishnabotna River which has been ditched and straightened, but parts of its original bottom lands are still wooded. Wooded hills are usually bur oak-shagbark hickory (*Quercus macrocarpa-Hicoria ovata*) association fragments, while the bottomlands are covered with elm-walnut (*Ulmus-Juglans nigra*), elm-soft maple (*Ulmus-Acer saccharinum*) and elm-box elder (*Ulmus-Acer negundo*) types. Roadsides and gullies are in many places covered with box elder and plum (*Prunus*) thickets or dense growths of hemp (*Cannabis sativa*). Farmyards are usually protected by Scotch pine (*Pinus sylvestris*), red pine (*Pinus resinosa*), and Norway spruce (*Picea abies*) planted a generation ago, and a few fruit trees.

The town of Lewis is 160 acres in area with about 150 homes and 1600 trees. Only 4.4 per cent of the trees are evergreens and of the remaining deciduous trees, elms make up 33 per cent, box elders 15.6 per cent, apples 10 per cent and soft maples 7 per cent. Altogether there are 35 species of trees represented.

METHODS

On Monday, Wednesday and Friday of each week all of the trees and other possible nesting sites in Lewis were examined. On Tuesday, Thursday, and Saturday the trees of fourteen farmyards cover-

[1] Journal Paper No. J-751 of the Iowa Agricultural Experiment Station, Ames, Iowa. Project No. 565, Fish and Wildlife Service (U. S. Department of the Interior), Iowa State College, Iowa State Conservation Commission, and the American Wildlife Institute cooperating.

ing forty acres were examined; and a twenty-acre cemetery planted with large evergreens, four gullies, and Cold Spring State Park were worked over for nests. The park is wooded and covers sixty acres so no attempt was made to examine every tree at each visit. No systematic search for nests on the ground in plowed and cultivated fields was made, but rather those nests reported by farmers were observed and recorded.

For each nest discovered the height above the ground, the distance from the tree trunk—if in a tree—and the size of the tree were recorded. Bi-daily records were kept concerning the life of each nest, its occupants, and its accidents; and when feasible without endangering the nest, the eggs were measured with calipers and young banded when between five and eight days old.

The work on this project was done under the supervision of Dr. Geo. O. Hendrickson, Assistant Professor in Wildlife Management, Iowa State College, and T. G. Scott, U. S. Fish and Wildlife Service.

Definitions

In the following discussion the following terms are used. *Nest* indicates each separate and distinct nest that the birds build. *Nesting* indicates each time that the birds lay eggs in a nest whether old or new, or each attempt at starting or raising a brood. *Renesting* refers to another nesting or brooding attempt in a dove's nest previously used in the same breeding season. Additional dove nests built in a tree already containing a nest or having had a nest in it during that season are spoken of as *secondary nests.* An *active nest* is any nest containing eggs, young, or one which is in any way being used by a pair of doves. A *successful nesting* is one in which the young have reached flying age, that is, ten to thirteen days old, and have left the nest.

Production of Nests

On the 220 acres under observation, 1108 nests were built in 1938 and 1443 in 1939. In these nests 1464 nestings were attempted in 1938 and 1975 in 1939. Hence these records concern 2551 nests and 3439 nestings. Approximately 250 breeding pairs of birds were active in the area in 1938 and 330 in 1939. The greatest number of nests existing in one day during the summer was taken as indicating approximately the number of nesting pairs for the area. There was an increase of 80 nesting pairs in 1939, but whether this increase was general over the southwestern part of the State was not determined. Each breeding pair averaged 5.85 nesting attempts in 1938

and, even though the pairs increased in 1939, they made 5.98 nesting attempts.

The start of the nesting season was on April 16 in 1938 and on March 23 in 1939. Although both years had warm weather during the last of March, it was quickly broken in 1938 by a heavy snowstorm on April 6, and interrupted in 1939 by a snowstorm on April 17. By this time many nests had already become established. The date that the last young left the last nest was October 15 in 1938 and October 11 in 1939. Gonadal development as shown by sexual activity of captive birds indicated that breeding activity could continue from about March 20 to about October 15 unless altered by weather (Cole, 1933).

No new nests were built after September 17, 1938, and after September 24, 1939. Although a storm of August 30 served only to truncate the September peak, a three-day cold rain and wind from September 13 through September 17 brought a halt to nest building in 1938. Hot winds from September 4 to 15, 1939, stopped nest building except for three unsuccessful attempts made after September 15. Continued warm and calm weather after these disruptive spells failed in both years to stimulate the birds to more nesting, although some were seen courting. Captive birds showed a cessation of activity at this time, too.

The nesting season in 1938 extended over 183 days, while in 1939 it covered 203 days. The nest-building season was, of course, shorter, covering 155 days in 1938 and 186 days in 1939. Nesting activity lasted 11 per cent longer in 1939 than in 1938.

The peaks of daily nesting activity in 1938 show four broods of young: one in June, one in July, a small one during the August nesting slump, and one during September. Fewer pairs were active in August and this produced the slump in active nests which was evident in both years. During June of both years the peak of nest production was on June 5. For 1939 this was the peak day of the year, while in 1938 highest nest production was on July 14. Considering the fact that the number of active nests during the last of June was increasing, it is probable that a high peak would have been reached in July of 1939 had not a severe storm destroyed one third of the nests.

STORMS

Wind and heavy storms are the greatest decimating factors of nests, eggs, and young. Nice (1922) reported similar findings in Oklahoma. During 1938 there were but few severe storms, while in 1939 the

season was a series of blasts. On June 7 a hailstorm occurred during which hailstones weighing as much as one-half pound fell. Nests were not only knocked out by wind and rain, but parents and young were killed on the nests by direct blows. Many species of birds were observed to have suffered from this storm. June 18 brought another severe storm, which halted the nest building that followed the storm of June 7. Losses of nests from storms and other causes were quickly regained. Late in June the number of nests was increasing daily and it is believed that there would have been a high peak in July of 1939 as there was in 1938, but on July 4 a near-tornado destroyed 33 per cent of the existing nests. Following this, nest production was gaining when subjected to another severe storm on July 16. Then a rainy spell during the first two weeks of August was climaxed by a cloudburst during the afternoon of August 10, when three inches of rain fell in two hours. As already indicated, the final slump of 1939 was brought about by ten days of hot, dry winds, which prematurely dried crops and blew nest after nest apart. While watching one high nest blow apart the observer almost caught the two young as they came crashing down to the hard pavement. During the two years of observation the majority of severe storms occurred at night.

Phases of Nest Building

Nest building of the Mourning Doves was divided into three phases. Graphic interpretation of the average difference between weekly losses and gains in the number of active nests during two seasons revealed these phases. During the first part of the season, from March 31 to June 9, there were more nests gained than lost each week so that there was a constantly greater number of active nests. This is termed the *acceleration phase* of nesting. From June 9 to September 1 occurred the *fluctuation* phase of nesting and it was during this time that the total active nests fluctuated with the vagaries of the weather, but each loss was regained. During the last of the season, from September 1 to the close of nesting in October, there were more nests lost each week than gained. This is the *deceleration phase* of nesting.

Production of Young

During 1938, 1502 young left nests in the observation area and during 1939, 1583 were successful. Storms and other agencies killed 220 young before they could leave their nests in 1938 and 275 in 1939. Therefore, in the two years 3085 young were raised and 495

were lost; or 3580 young hatched, but 13.7 per cent were killed. The per cent of loss in 1938 was 12.7 and in 1939 was 14.8.

The average number of young raised per nest built was 1.355 in 1938 and 1.097 in 1939. In 1938 the nesting attempts averaged 1.02 young and in 1939, 0.8. The young raised in successful nestings proved remarkably consistent, for in 1938 the average was 1.85 and in 1939 it was 1.8. Nice (1922; 1926) found a ratio of 1.7 young to the successful nesting.

Since nests are built constantly during the season, broods therefore overlap and are not evident. From the peaks shown by a graph there appear to be seven broods, but since breeding pairs average only six nesting attempts and lose half of these, this is not possible. The existence of broods is best indicated by observing all of the nesting attempts of single pairs. Some pairs succeed in bringing four sets of young from single nests. By determining the number of days between the earliest and latest nests to bring off four families, it is possible to indicate the presence of four broods. Since it takes but thirty days from egg laying until young leave the nests, theoretically, in a 180-day season six broods could appear.

In 1938, the earliest nest in which four broods were eventually produced was no. 38 built on April 30, and the latest was no. 529 built on May 25. In 1939 the earliest nest to produce four broods was no. 74 built on April 23, and the latest was no. 870 built on May 26. Six nests in 1938 and four in 1939 raised four broods. The time when the bulk of young from each brood left their nests was as follows:

TABLE 1

PERIODS OF SUMMER IN WHICH BROODS OF YOUNG MOURNING DOVES APPEAR

1938	*Days*
Brood 1—May 30 to June 20	21
Brood 2—July 5 to July 25	20
Brood 3—Aug. 5 to Aug. 25	20
Brood 4—Sept. 8 to Oct. 1	23
1939	*Days*
Brood 1—June 3 to July 4	30
Brood 2—July 4 to Aug. 3	30
Brood 3—Aug. 12 to Sept. 2	21
Brood 4—Sept. 13 to Oct. 3	21
Average	*Days*
Brood 1—June 1 to June 27	26
Brood 2—July 4 to July 29	25
Brood 3—Aug. 8 to Aug. 29	20
Brood 4—Sept. 10 to Oct. 2	22

The first brood begins to appear during the acceleration phase of nesting and the fourth brood falls entirely within the deceleration phase of nesting. The bulk of young appear during the fluctuation phase of nesting, since two broods are raised then.

Nesting Success

As a result of bad weather and the increased number of storms the nesting success of 1939 was less than that of 1938. Success in 1938 was 55.3 per cent while in 1939 it was 44.4 per cent, or 810 and 877 nestings, respectively. This is somewhat above the 40 per cent noted by Nice (1922) for Oklahoma. Destruction of nests containing eggs was more severe than the destruction of those containing young. During the two seasons the eggs hatched in 1,959 nestings, and only 272 of these nestings or 13 per cent were lost. Of the more than 6,300 eggs that were laid in two years only 48 per cent produced young that left the nest. Four times as many eggs as young were lost. Part of this greater success of young resulted from increased diligence on the part of the parents in protecting the nest. They did not defend the eggs with near the resistance demonstrated against danger to the young. Feet of the young are large and strong and they cling to the nest material tenaciously. Further, daily gain in weight as the young grow older also adds to the stability of the nest. All of these factors make the resistance of nests containing young 400 per cent greater than of nests containing eggs.

TABLE 2

The Number of Nestings in a Nest

Number of nestings	*1938*	*1939*	*Total*
1	845	1124	1978
2	183	233	416
3	57	70	127
4	12	14	26
5	2	2	4

TABLE 3

Success of Nestings

Number of successful nestings per nest	*1938*	*1939*	*Total*	*Per cent of success* 1938	1939	*Average per cent*
1	502	542	1044	58	48	53
2	110	120	230	60	51	55
3	21	27	48	36	40	37
4	6	4	10	50	28	38
5	0	0	0	0	0	0

During two years the largest number of nesting attempts in a given nest was five. Two nests each year were used five times, but none of the pairs of birds succeeded in raising five broods from the same nest. Tables 2 and 3 give the number of nestings in each nest and their success.

The two-year average percentage of success for nestings was 49 while 52 per cent of the nests built had successful nestings in them.

TABLE 4

SUCCESS OF NESTINGS IN NESTS USED MORE THAN ONCE

Times nest used	*Number of successful nestings*	*1938*	*1939*	*Percentage*
2	0	37	76	23
2	1	88	114	42
2	2	83	84	34
3	0	5	8	11
3	1	14	21	28
3	2	23	23	36
3	3	16	18	27
4	0	0	1	7
4	1	2	1	15
4	2	1	8	30
4	3	5	1	23
4	4	4	3	23
5	0	0	0	0
5	1	0	0	0
5	2	0	0	0
5	3	0	2	50
5	4	2	0	50
5	5	0	0	0

From Table 4 it is apparent that the majority of nests used twice had one successful nesting in them. Of those used three times over a third raised successful families; of those used four times nearly a third raised two broods; and of those used five times half raised three and half raised four families.

ESTIMATED PRODUCTION IN CASS COUNTY

Since Cass County is homogeneous topographically it is assumed that the area under observation was representative of the whole county. There are 2,380 farms and nine towns in the county which has an approximate area of 368,640 acres. Towns cover about 20,480 acres and, as the farmyards and lots under observation averaged 2.5 acres, it is assumed that there are 5,950 acres devoted to farm lots.

These two types of habitat produce the bulk of the doves, therefore all the rest of the area, including fields of crops, woods, stream bottoms, gullies, etc., are lumped together to give 342,210 acres. In this region of Iowa 61 per cent of the doves were produced in towns, 25 per cent were produced in farmyards, and only 14 per cent were produced away from farmyards and towns.

TABLE 5

TWO YEARS OF MOURNING DOVE PRODUCTION IN CASS COUNTY, IOWA

	1938		*1939*	
	Average per acre	*Total*	*Average per acre*	*Total*
5,950 Acres farm lots	9.5 nests	56,525	8.8 nests	52,360
	12.4 nesting	74,480	12.0 nesting	71,400
	11.3 young	76,235	7.6 young	45,230
20,480 Acres towns	4.3 nests	88,064	6.7 nests	137,216
	5.8 nesting	118,784	9.4 nesting	192,512
	6.4 young	131,072	7.9 young	161,792
342,210 Acres remaining	0.1 nest	34,221	0.1 nest	34,221
	0.1 nesting	34,221	0.11 nesting	37,643
	0.08 young	28,517	0.11 young	37,643
Total	Nests	178,810		223,797
	Nestings	227,485		301,555
	Young	226,824		244,665

The average production for two years was 201,303 nests, 264,520 nestings, and 235,744 young, with a possible plus or minus error of ten per cent. Because of the thoroughness with which the observation area was examined each season, it seems hardly possible for the error to be greater than ten per cent. Even a ten per cent error would mean that 255 nests were missed and this seems improbable. Nesting away from farmyards and towns was estimated to be about one nest to ten acres for both seasons.

Since the breeding stock apparently brings off enough young to treble itself each season, then the average breeding stock for two years was 78,581 birds, or a theoretical total of 314,325 young and parents could be expected to be in the county at the end of each season. This is one dove to each 1.2 acres. The actual number is not as great as this since both young and parents suffer losses during the season, and more or fewer birds may return each spring.

POPULATION CHANGES

That any slight change in environmental resistance produces a corresponding change in the total population is brought out by the 1939 production. There were 1.32 as many breeding birds in 1939 as in 1938 and these birds made 1.32 as many nesting attempts. Each individual pair made an average of 5.85 nestings in 1938 and 5.98 in 1939, so that a difference of only 2 per cent existed between the efforts of the birds each year. But the 1.32 birds raised only 1.07 as many young in 1939 as in 1938 which is a difference of 0.25 birds or 24 per cent. That is, the 1939 number of breeding pairs failed to produce the number of young that could be expected of such a breeding population under 1938 conditions. Hence, the environmental resistance of 1939 breeding season must have been 24 per cent more severe than in the season of 1938. This is borne out by the fact that there were several more destructive storms in 1939. In the area under observation breeding stock in the spring of 1939 was eighty pairs greater than in 1938, or 32 per cent more birds began this season. If we assume that such an increase was widespread over the county, then it is apparent that the winter of 1938–39 was 32 per cent less severe on the birds than that of 1937–38. If the environmental resistance was 32 per cent less during the winter and 24 per cent greater during the summer, the resistance for the entire year was 8 per cent less in 1939 than in 1938, and a corresponding increase in young would be expected. The actual increase in young was 7.86 per cent.

CENSUSING BY NESTS

Not only was the total nesting activity greater in 1939 than in 1938, but, except for September, the average daily number of active nests for each month was higher. This held true for nesting in town, but in the country the reverse was true. In 1939, country nesting was consistently less by monthly average (see Table 6).

The two-year average number of nesting attempts was 1720. In order to find how many nestings for the season a given number on any day of the month would indicate it is necessary to determine the ratio of daily activity to the season's yield (Table 7).

The months of June, July and August are those when the average daily nesting is of most consistent ratio to the season's yield and it is during these months that censusing by nests should be undertaken. The success of nesting for the two years was: town, 51.4 per cent; country, 45.3 per cent; or an average of 50 per cent. The

TABLE 6

Average Number of Active Nests per Day per Month in the Observation Area

Month	Total			Town			Country		
	1938	*1939*	*Aver.*	*1938*	*1939*	*Aver.*	*1938*	*1939*	*Aver.*
March		2	1		2	1			
April	15	31	23	9	24	15	7	7	7
May	125	193	159	71	147	109	53	44	48
June	224	297	260	132	232	182	91	65	78
July	219	250	234	140	200	170	82	55	69
August	183	218	200	130	174	152	52	43	47
September	145	90	118	105	69	87	40	21	31
October	21	4	12	18	3	10	4	1	2

TABLE 7

Ratio of Daily Active Nests by Month to Season's Yield

Month	*Average*	*Town*	*Country*
April	75.0	81.0	71.0
May	10.8	11.2	10.3
June	*6.6*	*6.7*	*6.3*
July	*7.3*	*7.2*	*7.2*
August	*8.6*	*8.1*	*10.6*
September	14.5	14.1	16.0
Average	10.4	10.2	10.8

average number of young produced in a successful nesting was 1.82, for town 1.86 and for country 1.73.

The average maximum number of breeding pairs for two years was 290, with the maximum 210 in town and 93 in the country. Dates of maximum activity in town and country did not coincide, hence the discrepancy in the above figures. In order to determine the number of active pairs in an area it is necessary to know what part of them are actively nesting each month (see Table 8).

TABLE 8

Ratio of Pairs of Birds Seen Nesting each Month to Total Breeding Stock

Month	*Average*	*Town*	*Country*
April	12.0	14.0	13.0
May	1.2	2.0	2.0
June	*1.1*	*1.1*	*1.2*
July	*1.2*	*1.2*	*1.3*
August	*1.5*	*1.3*	*2.0*
September	2.4	2.4	3.0

In censusing a given area by use of nests make the following observations:

1. Do the censusing during the fluctuation phase of nest building, i. e., June, July, August, preferably June and July.

2. Do not census immediately after a storm or bad weather, but make observations after a week of mild weather, if possible.

3. Pick out sample habitats of the entire area. The size of these sample habitats will depend upon the observer's method, but preferably should be from five to ten acres in extent. That is, in towns examine nesting sites of several blocks and in the country examine several different farmyards. Miscellaneous sample plots should each cover several acres.

4. Examine every tree, bush, shrub and likely place in the sample areas for nests.

5. Add up the total number of active nests seen and the total acreage covered. Do not count inactive nests.

6. Multiply the total nests by the ratio figure for the month of census in order to determine the total nests that will be attempted in the area.

7. Multiply this figure by the per cent of success, i. e., 50 per cent.

8. Multiply the successful nestings by the number of young raised per nest, i. e., 1.82. This gives the number of young that may be expected to be raised in the sample area.

9. Multiply the number of active nests in the area by the month's ratio of nesting birds to the breeding stock and this gives the number of breeding birds in the area.

10. Add the total breeding stock to total young raised for the total of birds in the area at the end of the season. Success of this census depends upon the thoroughness of the observer in finding nests. During mild weather in the fluctuation phase of nest building, the daily difference in number of active nests is seldom more than ten per cent of the average activity, hence a plus or minus ten per cent correction will make the final figure more nearly accurate. Losses of young and parents during the season from cats, automobiles, diseases, accidents, etc., are variable, but data at hand indicate that they are between three and ten per cent, but may be much higher. Correcting the total production computed by this figure will give the expected, theoretical, fall population. Per-acre production can be determined by dividing the final figure by acres of census area.

Censusing by this method like censusing by the *coos* of the bird (McClure, 1939) is subject to many variables and at best can only be a somewhat closer estimate than a guess. If the area under observa-

tion at Lewis should be an exceptional one, then all of these figures would be too high, but it is believed that the ratios as given are consistent and will be consistent for the bird regardless of the area under observation. Meteorologically the two seasons of observations differed greatly but the reactions of the birds were very consistent.

SUMMARY

From March to October of 1938 and 1939 nesting of the Mourning Dove was observed in a 220-acre area in southwestern Iowa at Lewis. One hundred and sixty acres of this were in Lewis and the remainder scattered among farmyards, gullies, and woods.

During the two years, 250 breeding pairs in 1938 and 330 pairs in 1939 made a total of 3439 nesting attempts. Each pair built about six nests and one-half of the nesting attempts were successful in rearing young.

Nest building during the breeding season was divided into three phases: an acceleration phase in spring, a fluctuation phase during summer, and a deceleration phase in fall.

In the two years, 3085 young were reared. Of the young that hatched, 87 per cent were successful in leaving their nests, but only 48 per cent of the eggs that were laid produced successful young.

Although there were 32 per cent more breeding doves in 1939 than in 1938, decimating factors reduced production of young to but 7.86 per cent more for 1939.

A method of censusing the dove population by counting active nests in sample areas is given. Nests are counted and then multiplied by standard figures to give the total young that may be produced by the end of the season.

LITERATURE CITED

COLE, L. J.
1933. The relation of light periodicity to the reproductive cycle, migration, and distribution of the Mourning Dove (*Zenaidura macroura carolinensis*). Auk, 50: 284–296.

McCLURE, H. ELLIOTT
1939. Cooing activity and censusing of the Mourning Dove. Journ. Wildlife Management, 3 (4): 323–328.

NICE, M. M.
1922. A study of the nesting of Mourning Doves. Auk, 39: 457–474, pl. 18.
1926. Nesting of Mourning Doves during September, 1925, in Norman, Oklahoma. Auk, 43: 94–95.

Ames, Iowa

SWAINSON'S WARBLER IN NICHOLAS COUNTY, WEST VIRGINIA

BY MAURICE BROOKS AND WILLIAM C. LEGG

THIS paper is an account of the discovery of Swainson's Warbler (*Limnothlypis swainsoni*) as a locally abundant summer resident in Nicholas County, West Virginia, at elevations up to 2000 feet above sea level, on the Allegheny Plateau.

HISTORY

The history of our knowledge of Swainson's Warbler is a curious one, falling into definite periods. After its discovery by Bachman near Charleston, South Carolina, in 1832, it remained virtually unknown until the latter years of the nineteenth century, when a series of notes and papers relating to the bird appeared. During this time, and the early years of the present century, much was added to our information; the bird was found as far north as Oklahoma, southeastern Missouri, southern Illinois, southern Indiana, and Warwick County, Virginia. Practically every observation which appeared in print confirmed the generally held belief that this species is virtually restricted to the cane swamps of the Atlantic Coastal and Gulf regions, in the Austroriparian division of the Lower Austral Zone. It is notable that the latest (1931) edition of the A. O. U. 'Check-list' does not record a single accidental occurrence of this bird north of its accepted breeding range.

Belief in these restrictions of range having become an *idée fixée* among ornithologists, little attention, apparently, was paid the species from about 1910 to 1930. In fact, reference to the indices of 'The Auk' for the years 1910–30 shows just eleven occasions on which the bird is mentioned, most of these being of a decidedly casual nature.

On June 14, 1924, Mr. P. C. Bibbee, collecting for the museum of West Virginia University, took a male Swainson's Warbler at Buzzard's Rocks, Monongalia County, West Virginia, a rugged region of hemlock- and rhododendron-clad mountains only a few miles from the Pennsylvania border. Unfortunately, Mr. Bibbee's record was not published until 1934 and so escaped the attention of the A. O. U. Check-list Committee.

During the summer of 1932, Mr. F. M. Jones, a field worker who has carried on extensive studies in the Bristol region of southwestern Virginia, reported the presence of Swainson's Warblers in this territory, and also collected a nest and eggs. So remarkable was this

record considered that, in the absence of a specimen of the bird, and despite the nest and eggs taken, it was not accepted for publication at the time, and did not appear until October, 1939 (Murray, 1939).

Murray (1935) records the finding of nests of this species in Robeson County, North Carolina, about ninety miles inland from the coast, although at the upper edge of the Coastal Plain. Williams (1935) tells of seeing the birds near Tryon, in mountainous western North Carolina, on May 8, 1934, "in open woods on a ridge about 100 yards from the nearest water, a small spring." From May 9 to 14, 1935, he found the birds in the same locality, and states, "Parts of the hill have thick growths of mountain laurel, but these warblers did not confine themselves to the thickets but were often in the open woods and were easily observed." Williams's record is the first one from western North Carolina, and is, we believe, the first recorded occurrence of the species in a mountainous region.

In connection with an expedition for the Smithsonian Institution, Wetmore (1937) collected the second West Virginia specimen of Swainson's Warbler in Lincoln County, on April 28, 1936. This region is hilly and rugged, on the western edge of the Allegheny Plateau. Doing similar work in Tennessee, Dr. Wetmore (1939) collected an adult male Swainson's Warbler on June 8, 1938, at an elevation of 3000 feet "in the Holston Mountains, 3 miles northeast of Shady Valley, in a swampy area shaded heavily with hemlock and rhododendron." Two other birds were noted in the same general region at 2600 feet.

The junior author of this paper (Legg, 1939) found during the summer of 1939, near his home at Mt. Lookout, West Virginia, birds which he believed to be Swainson's Warblers. He had them under observation for some time, and took careful notes on their appearance and behavior. The birds returned to the same region in 1940, and the senior author, accompanied by Mr. William A. Lunk, visited the region in June, 1940. On June 25 a breeding male was collected.

It has been an experience common to many collectors in the central and southern Appalachian regions that a species, once found, is finally traced to an area where it is at least locally abundant. For Swainson's Warbler the region around Mt. Lookout, in the southwestern part of Nicholas County, is certainly such an area.

CLIMATE AND TOPOGRAPHY OF THE REGION

Nicholas County, West Virginia, is in the south-central portion of the State, lying to the west of the main Allegheny ridges, and having the rugged terrain characteristic of the Allegheny Plateau. Near

Mt. Lookout, the center of an area which the birds occupy, the 38th parallel of north latitude and the 81st meridian intersect. Virtually all the surface of the county is Palaeozoic, of either the Mississippian or the Pennsylvanian periods. Near Mt. Lookout the surface strata are of the Pottsville series, New River and Kanawha groups predominating.

The region is well watered by streams forming a dendritic pattern. At Holcomb, where weather records have been kept for a period of years, mean annual rainfall averages 53.22 inches, many years having precipitations above 60 inches.

Elevations in the Mt. Lookout region lie between 2200 feet and 1300 feet at the Gauley River level. Valleys are narrow, and the streams have a precipitous descent. Of the three principal streams along which Swainson's Warblers have been found, Gauley River in 62.7 miles in Nicholas County falls 1347 feet; Collison Creek, a tributary of Gauley, falls 900 feet in 5.9 miles, or an average fall of 152.5 feet per mile; and Anglins Creek, a tributary of Meadow River, falls 775 feet in 6.4 miles. Collison Creek drains an area of approximately ten square miles, while Anglins Creek drains approximately 29 square miles.

At Holcomb the mean average yearly temperature has been 50.3° F. Under the Köppen system of climates this would classify as *Cfb*, a region of moderate temperature, well-distributed precipitation, and cool summers.

THE BIRD IN ITS HABITAT

The region where Legg first found the birds in 1939 was lightly lumbered some years ago, and is now in the pole and young-timber stages of forest growth. There is an extremely dense understory, virtually forming a jungle, and comprising as principal species rhododendron (*R. maximum*), mountain laurel (*Kalmia latifolia*), hemlock (*Tsuga canadensis*), and American holly (*Ilex opaca*). Since the region is abundantly watered this growth extends well toward the tops of the ridges, and a more impenetrable tangle would be hard to find. Where small openings occur blackberry briers (*Rubus* sp.) are dense, adding to the difficulties of travel and observation.

The birds were first noted in 1940 on May 16, along Franzy Creek, a small branch of Collison Creek. Within a short time territories had seemingly been established, and within a mile and a half along this stream there were ten or eleven singing males whose presence could regularly be counted on. Later exploration by Legg revealed the presence of the birds in good numbers on Malinda Creek, close by,

and on Gauley River proper. Brooks and Lunk found them in June, 1940, along another tributary of Collison Creek, four miles north and east of Mt. Lookout, and along Anglins Creek some miles to the south. All the birds seen were in the characteristic rhododendron-laurel-holly-hemlock tangles, and it was literally true that we did not visit a single area of this kind in the region without finding the birds present. Along West Virginia Highway No. 41 three males were heard in song at one time, and we stopped at a number of places where two birds could be heard at the same time.

A typical territory along Franzy Creek where Legg has had a singing male under observation throughout the season includes about one hundred and fifty yards bordering the small stream. Near the center of the area is a small clearing, now in the brush stage, and around it is the dense growth mentioned above as characteristic of the region. Near the borders of this opening are heavy growths of ferns, principally the hay-scented fern (*Dennstaedtia punctilobula*). Blackberries and greenbrier (*Smilax*) are abundant. Over the dense shrubby understory is a fairly loose forest canopy made up principally of hemlock, red maple (*Acer rubrum*), and Fraser's magnolia (*M. fraseri*). There are sizeable sandstone cliffs on the steep slopes above the stream.

The singing bird may be heard from any point in this territory, if conditions are good. It visits all parts of the territory save the opening, but it regularly works around the edges of this. It is seldom heard more than fifty or seventy-five yards from the stream. On June 24 the authors, with Lunk and Clyde McClung, visited this territory during the afternoon. The bird was not singing during our stay at that time, but 'squeaks' made near the edges of the clearing soon called it (or at least a Swainson's Warbler) close to us; it made known its presence by a penetrating chirp. The same territory was visited the next morning, and the bird, ranging over the area, sang almost constantly for more than an hour. There is an alder fringe along the stream near the opening, and we heard the bird in this growth for a short time. This territory has an elevation of about 1650 feet.

Farther up and down this same stream are the territories of other singing birds, all of them quite similar except one near the headwaters of a branch stream where the woods are more open. Even here there are plenty of thickets, however.

All of the birds observed save one were fairly close to water, although the streams were often little more than roadside ditches distinctly 'wet-weather' in character. The one exception to the general

rule was a singing bird well up toward the top of a ridge in a thicket under standing dead chestnut trees, testimonials to the devastating effect of the chestnut-bark disease. In another paper (accepted but not yet published by 'The Wilson Bulletin') the senior author has discussed at some length these chestnut-sprout areas as a distinct ecological niche for breeding warblers, and it was interesting to find, unexpectedly, this species in such a situation.

Writing of the birds of northern Florida, Eliot and Loetscher (1935) state: "Having supposed this species [Swainson's] was always associated with 'cane,' we were surprised when on April 3, near Jacksonville, Mr. S. A. Grimes showed us one singing in caneless woods where its most prominent companions were Hooded Warblers and (not yet arrived) Acadian Flycatchers and Wood Thrushes." This statement is of particular interest to the present writers, since the three birds mentioned are among the common associates of Swainson's Warblers in West Virginia. The avian association, and particularly that of the warblers, is an interesting one in this section of Nicholas County. At virtually every point where we heard Swainson's we also heard Hooded and Kentucky Warblers, and Maryland Yellow-throats. Chats were fairly common, and Worm-eating Warblers were present. These species of southern association were definitely to be expected, but in the same territory we heard a singing Black-throated Green Warbler, and, as one of us was peering to see a singing Swainson's, a Blackburnian Warbler flew into a tree close to us. Inexplicably absent (although the same condition has been noted in many parts of central West Virginia) were Redstarts. In almost every case when we found Swainson's in song we would hear the song of one or more Parula Warblers in the trees above. Black and White Warblers, Louisiana Water-Thrushes, and Ovenbirds were also common. White-eyed Vireos were abundant at the edges of the thickets, as were Cardinals, Towhees, and Indigo Buntings. Bewick's Wrens were in song from the fences and tangles of fallen logs in the more open places.

In an account of the birds of a region in northwestern Florida, Worthington and Todd (1926) write: "Its [Swainson's Warbler's] favorite haunts are the dense thickets on the edge of the lowland woods, where it contrives to keep so well concealed that were it not for its characteristic song its presence would go unsuspected. It is fond also of rank fern growth, where it is equally successful in eluding observation and capture. Only once did we find it in the dry upland, among the thick scrub oaks. The birds spend most of their time on the ground among the dry leaves, walking along grace-

fully, like the Oven-bird, and uttering their song at frequent intervals." With the necessary allowances made for differences in the topography of the two areas, this would make a very satisfactory description of the habits of the bird as we observed them in West Virginia. Even the fondness for dense fern growths is notable.

We found the birds difficult to observe, and extraordinarily difficult to collect, in their favorite haunts. So dense are the shadows under rhododendron and hemlock thickets that only the closest observation revealed the movement of the birds. With their rather neutral brown coloration, their rapid movements, and their apparent liking for the centers of the thickets, they seemed to blend imperceptibly into their surroundings. Often enough when we were very close to the birds, and would catch a glimpse of them in the tangles before us, they would fly without our catching the movement at all. Every time an attempt was made to follow the birds through the thickets they would fly, sometimes to a considerable distance, before we could see them. 'Squeaking' would bring them fairly close, usually much too close to make shooting feasible. The only good observations we made were from the edges of clearings, or from roads or trails. The fortunate circumstance of an old logging trail along Franzy Creek gave us a chance to observe, and made possible the securing in good condition of the example collected, a male with well-developed gonads.

Almost everyone who has written of the haunts of Swainson's Warblers has quoted the statement of Brewster (1885): "Briefly, four things seem indispensable to its existence, viz., water, tangled thickets, patches of cane, and a rank growth of semi-aquatic plants." From the account given above, it will be evident that of these four only the first two are present in the West Virginia situations which the birds select, and that even water is scant or wanting in some cases.

VOICE

In this day of mechanical recording of bird songs one approaches so subjective a matter as the description of a bird's notes with great caution. Earlier writers found in the notes of Swainson's Warbler such attributes as "mystic," and "indescribably tender," qualities which in this more prosaic world seldom enter into the description of birds' voices. So important is song in the matter of observing this species, however, that we venture some observations on the notes which we have heard in West Virginia.

As many writers have pointed out, one becomes aware of the presence of the bird largely through the medium of its voice. In following up the distribution of the species in territories where it

had not before been noted, we made a habit of stopping at frequent intervals as we drove a car along the highway. To us it seemed remarkable that we heard so many different individuals in this way. Often enough we could hear the song through the open windows of the car as we drove along. Brooks and Lunk heard the bird in this way at a number of points along the highway before Mt. Lookout was reached.

The comparison of the song of this species with that of the Water-Thrush or the Louisiana Water-Thrush is an oft-made, and, to our ears, an apt one in many respects. Certainly the same quality is present, and the beginnings of the songs are sufficiently alike to suggest immediately a similarity. We are convinced that it would be very easy to pass the song by, believing that we were listening to the somewhat unusual notes of a Louisiana Water-Thrush, or even a Northern Water-Thrush. In fact, Brooks and Lunk heard one series of songs from a bird (which sang at other times in a more usual fashion) that sounded to us almost precisely like a Water-Thrush.

The song most frequently given by the birds we heard appeared, to the senior author at least, to consist of three or four sharp, high introductory notes, all well separated, followed by a phrase of four or five syllables uttered rapidly, and slurred. It might be transliterated as *whee, whee, whee, whip-poor-will,* the first two (or three) introductory notes on even pitch, the last *whee* a half-tone lower, and the slurred phrase with *will* separated into two syllables, and accented on the *whip* and on the *wi-* part of the *will.* The last phrase sounded at times remarkably like one of the songs of the White-eyed Vireo.

Occasionally the song trilled off at the end into a series of indeterminate notes, and it was this song which approached most closely the vocalizing of the Louisiana Water-Thrush. Legg has noted three singing birds in one locality, all of which have a song, the last phrase of which suggests *poor-will-poor-will,* given very rapidly. He has also heard a longer than usual song given as a 'whisper' song on a number of occasions.

Along Anglins Creek, Brooks and Lunk had the good fortune to hear a Swainson's Warbler and a Louisiana Water-Thrush singing at the same time. To us it seemed that the Swainson's song was the louder and more penetrating of the two. Lunk saw this particular Swainson's Warbler in full song, and at close range. His impressions correspond closely with those of Brown, as quoted by Chapman (1907): " . . . I was impressed by the absorbed manner in which this bird sings. Sitting quietly upon a limb of a small tree, he suddenly throws back his head and pours forth his notes with utmost fervor

and abandon. During the intervals of silence he remains motionless, with plumage ruffled, as if completely lost in musical reverie."

The birds frequently announce their presence by means of clear, penetrating chirps, having (to our ears) much the same quality as do the chirps of the Mourning Warbler. They are not quite so loud, but have a more ringing quality than those of the Hooded Warbler.

During a hot afternoon of sun and showers we heard singing birds under a variety of conditions. They sang freely during sunny periods in mid-afternoon. On the misty morning of June 25, three birds were heard in full song at one place along the public highway at 5.00 a. m. During the mid-day period singing was somewhat sporadic, however.

BREEDING

So far as we are aware, no occupied nest of Swainson's Warbler has yet been found in West Virginia, although Legg and Clyde McClung found an unoccupied nest, which may well have been made by this species, a rather bulky affair of beech and magnolia leaves and hemlock twigs, grass-lined, in tangled bushes much frequented by the birds. As has been mentioned, the male taken was in breeding condition. Along Anglins Creek, Brooks and Lunk observed a young bird being visited by a Swainson's Warbler, probably a female, since a male was singing close by. Concerning nests which he found in Virginia (and northeastern Tennessee), F. M. Jones (in correspondence) states: "On May 29, 1932, I found a completed nest of the Swainson's Warbler and although that was the first nest of its kind I had ever seen in this State, I recognized it as being that of the above-mentioned warbler. On returning to the location on June 4 I found the bird sitting on the nest which contained four fresh eggs. The bird still sat on the nest while I observed her two feet distant from me but when I reached out my hand to touch her, she jumped off the nest and ran off on the ground like a mouse. This nest was in a very dense growth of rhododendron bushes close to a stream of water where the sunlight never penetrated. It was 5 ft. 6 in. up, built on the forks of a slender beech limb which grew across the top of a rhododendron bush (*R. maximum*) and partly supported by the top of the rhododendron. The nest was composed of various kinds of leaves of which were included those of the beech, sugar maple, chestnut, black birch and white oak. The bottom part of the nest was made of leaves placed flat without any uniformity of the layers on the outside portion of the nest. The

leaves next to the lining were very thin and skeletonized and were placed closely together edgewise. Along and above the rim, fine hemlock twigs projected above the lining of white-pine needles. The outside of the nest measured 7 in. wide by 5 in. deep and the inside 2 in. wide by 1 13/16 in. deep. On June 6, I found another nest 150 feet distant built in a clump of sprouts at the exact height of the first. A bootlegger who had been hiding whiskey in the thicket had tilted the nest over, spilling the eggs on the ground. This nest was identical in construction to the first found and measured on the inside 1¾ in. by 1¾ in. On the same date I found a partly completed nest close to where I found the first nest which was no doubt a second nesting of the original pair found. Being interested in the finds I went in other localities and found them nesting in the Holston Mountains in Sullivan County, Tennessee, on Jacob's Creek at an elevation of 1850 feet, and found two nests on June 4 containing four fresh eggs each."

Despite the lack in West Virginia of a nest of proved ownership, there can be little doubt, from the behavior and abundance of the birds, that they are breeding regularly in the region. Legg's observations on the definite territorial ranges of individual birds are significant in this connection. Due to the difficult nature of the cover and terrain the actual finding of an occupied nest may be highly fortuitous, but we have no doubt that it will be accomplished within the next few years.

These observations extend the known range of Swainson's Warbler a degree or so northward, but the matter of latitude is of small importance as compared with habitat extension. Bibbee in northern West Virginia, Jones in southwestern Virginia, Williams in North Carolina, and Wetmore in Tennessee, all have pioneered in suggesting this range extension into the Appalachian Mountains region. It seems unnecessary to point out the ecological differences which exist between coastal-plains cane swamps and rhododendron 'hells' of the Allegheny Plateau. Yet these birds have bridged the differences, and have established themselves in both situations.

It would seem that we have here a perfect setup for racial separation, yet there is no morphological evidence, so far as the writers know, for its existence. Ecological evidence for such a separation is, of course, arresting. It may be, however, that further observation, incredible as it may seem, will prove that the two vastly different ecological provinces which the birds occupy are not discontinuous, but are joined through bridging territory which crosses the Piedmont

and the Ridge and Valley provinces. Much of the near South is still *terra incognita* to the ornithologist.

SUMMARY

1. The paper recounts the discovery of Swainson's Warbler (*Limnothlypis swainsoni*) as a locally abundant summer resident in Nicholas County, West Virginia.

2. The birds are found at elevations from 1300 feet to 2000 feet, in rugged country of the Allegheny Plateau.

3. They inhabit dense thickets composed principally of rhododendron, mountain laurel, hemlock and American holly.

4. Associated with them are such expected species as Kentucky, Hooded, and Worm-eating Warblers, White-eyed Vireos, and Bewick's Wrens, and also such unexpected species as Black-throated Green and Blackburnian Warblers.

5. Although no occupied nest has yet been found in West Virginia, evidence is given to support the breeding of the birds in every suitable niche in the area, and unpublished notes on the nesting of the birds in southwestern Virginia are given.

6. Notes are given on the song habits of the birds in the region.

LITERATURE CITED

BAILEY, H. H.
1908. Swainson's Warbler and Chuck-will's-widow breeding north of the James River, Virginia. Auk, 25: 478–479.

BIBBEE, P. C.
1934. Birds of West Virginia: a check-list. Bull. West Virginia Agr. Exp. Sta., Morgantown, no. 258, 47 pp.

BREWSTER, WILLIAM
1885. Swainson's Warbler. Auk, 2: 65–80.

BROOKS, MAURICE
1939. Further notes on Swainson's Warbler in the central Appalachian region. Raven (mimeographed), 10: no. 12, 4–5.

CHAPMAN, F. M.
1907. The warblers of North America. D. Appleton & Co., New York, ix + 306 pp., 24 pls., 12 figs.

ELIOT, S. A., AND LOETSCHER, F. W.
1935. Some notes on Florida birds. Auk, 52: 462–463.

LEGG, W. C.
1939. Swainson's Warblers? Field Ornithology, 1 (12): 14–15.

MURRAY, J. J.
1935. Breeding of Swainson's Warbler in Robeson County, North Carolina. Auk, 52: 459.
1939. Swainson's Warbler in southwest Virginia. Raven (mimeographed), 10: nos. 10–11, 9.

REGER, D. B.
1921. Nicholas County. West Virginia Geol. Surv., County Reports, Morgantown, W. Va., xviii + 847 pp., 34 pls., 24 figs.
WETMORE, ALEXANDER
1937. Observations on the birds of West Virginia. Proc. U. S. Nat. Mus., 84: 401–441.
1939. Notes on the birds of Tennessee. Proc. U. S. Nat. Mus., 86: 175–243.
WILLIAMS, ELLISON A.
1935. Swainson's Warbler in the North Carolina mountains. Auk, 52: 458–459.
WORTHINGTON, W. W., AND TODD, W. E. CLYDE
1926. The birds of the Choctawhatchee Bay region in Florida. Wilson Bull., 38: 204–229.

West Virginia University
Morgantown, West Virginia
and
Mt. Lookout, West Virginia

A WESTERN RACE OF THE TOOTH-BILLED TANAGER

BY A. J. VAN ROSSEM

EVER since Oberholser (Auk, 36: 74, 1919) in 1919, described *Piranga hepatica oreophasma* from the Chisos Mountains in Texas and included in the range Arizona, New Mexico, and most of northern and central Mexico, there has been considerable diversity of opinion as to its tenability. Varying opinions have been expressed by Zimmer (Field Mus., Zool. Ser., 17: 213–219, 1929), Griscom (Bull. Mus. Comp. Zool., 75: 409, 1934), Hellmayr (Field Mus. Nat. Hist., Zool. Ser., 13: pt. 9, 285, 1936), and the present writer, while various other authors have used or ignored the name without critical comment. Zimmer and Hellmayr emphatically rejected it as did Griscom, though rather tentatively so; I (Trans. San Diego Soc. Nat. Hist., 6: 290, 1931) upheld it chiefly on the basis of series of specimens from Arizona and Sonora, a region which came within the range as originally outlined, but also noted that birds from even so far west as Sierra County, New Mexico, were not representative of those from Arizona and Sonora.

Since that time I have seen much additional material and have come to the conclusion that *oreophasma* is a very dubious race but that the name may be useful in designating the slightly darker, slightly larger birds of extreme northeastern and north-central Mexico and of Texas and New Mexico. Another conclusion is that the Tooth-billed Tanagers from the Pacific drainage in Arizona and Sonora are distinct from *hepatica* and still more so from *oreophasma*. Further comment is made below, together with the proposed name of

Piranga flava zimmeri subspecies nova

WESTERN HEPATIC TANAGER

Type.—Male adult, 30604 Dickey collection; Chinobampo, southern Sonora, Mexico, March 7, 1930; collected by J. T. Wright.

Subspecific characters.—Paler and grayer than any of the named North American races of *Piranga flava*. Compared with *Piranga flava hepatica* of the Mexican Highlands generally, adult males paler and more rosy (less scarlet) red below, and with the flanks paler and grayer; upper parts paler and with the back very much grayer. Females and young males parallel the differences seen in adult males; ventrally they are paler yellow below and paler and grayer (less olive) dorsally, particularly on the back.

Range.—Upper Sonoran and lower parts of the Transition Zones (oak-pine association) from Arizona south along the west slope of the Sierra Madre and adjacent ranges to extreme southern Sonora and southwestern Chihuahua. Prob-

ably resident, in part at least, from central Sonora southward, but occurring as far south as Jalisco (Bolaños, British Museum, March 13).

Remarks.—There are no available specimens known to me whereby to trace the breeding range of *zimmeri* southward from Sonora and Chihuahua. To the eastward, nine specimens from the Chiricahua Mountains are so intermediate in character that they might as well be called *oreophasma* as *zimmeri*. Two from Chloride, Sierra County, New Mexico, I place definitely as the former race. One specimen from Pacheco, Chihuahua (on the interior slope) is *oreophasma*.

Measurements seem to be of little value in identifying individual specimens of the Mexican races of this species, save possibly in the case of *dextra*. There are minor group tendencies but size variation is notable, even in birds from the same locality: seventeen adult males of *zimmeri* have a wing measurement of from 99 to 106 (103.5) mm.; sixteen adult females 93 to 101 (98.4) mm.

Since the nomenclature of the central and eastern Mexican races of *flava* hinges upon the identity of Swainson's type of *Pyranga hepatica,* I made a special point of looking up this specimen when at Cambridge in 1933 and re-examined it in 1938. Fortunately it is still extant and I can record that it is typical of the race to which the name is currently applied. It is an adult male in perfect plumage, evidently taken in the fall or early winter for there is no abrasion evident anywhere and even the feathers of the chest retain their faint gray tipping. So far as I can see, it is typical in both color and size. The back is strongly reddish gray, the under parts are brightly colored and the flanks are olive gray. Measurements are as follows: wing, 101 mm.; tail, 81.5; exposed culmen, 18.2; tarsus, 22.2; middle toe minus claw, 16.0. The attached tag reads, "Genus Pyranga/P. hepatica Sw./Mexico." Undoubtedly Bullock was the collector for the skin is typical of his 'make,'—flattened, distorted, and with only a tuft of cotton in the neck and throat. In his description Swainson gives Real del Monte [Hidalgo] as the type locality, which may or may not be the case for four specimens from Jacala, Hidalgo, kindly sent me by Dr. George M. Sutton (among other material) show some tendencies in color toward *dextra*. They are nearer *hepatica,* however. Should a series from Real del Monte prove to be nearer *dextra,* a shift of type locality would be in order for Swainson has been shown more than once to have been careless in citing localities incorrectly and besides, in this case he cites "Table land" *and* "Real del Monte." [Since the above was transmitted for publication, information has been obtained to the effect that Swain-

son's "Real del Monte" locality inclusions were not based on Bullock material. Furthermore, "Tableland" in this and in nearly all other cases where given by him means the Valley of Mexico. This matter will be elaborated in another paper. In the present case the type locality of *Piranga hepatica* should be corrected to the Valley of Mexico.] However, there is no doubt as to the type specimen. Swainson's measurements accord closely with my own measurements of this particular specimen and this combined with his short description ("Grayish livid, beneath bright red; [etc.]") together with the fact that it is a Bullock skin would seem to settle the matter. I could not find the female which was described at the same time.

Los Angeles, California

A REVIEW OF THE SPECIES *Anas castanea*

BY S. DILLON RIPLEY

THIS species has been a subject of controversy for many years. The question of whether male specimens from Australia breed in female as well as in nuptial plumage provoked a great deal of confusion culminating in the setting up of a new genus, *Virago* Newton (1871), based on the mistaken impression that the female of this species also possessed the tracheal *bulla ossea* characteristic of the male. The present review has been prompted by the feeling that a careful study of the specimens in the collections in this country (especially in the splendid Mathews Collection) might reveal some facts of interest about the distribution of these little-known birds.

My thanks are due to the authorities of the United States National Museum and the American Museum of Natural History for the loan of specimens in their collections. Dr. Ernst Mayr has generously permitted me to describe a new subspecies from the American Museum's Whitney Collection. To Dr. G. M. Allen, Mr. J. L. Peters and Mr. J. C. Greenway, Jr., of the Museum of Comparative Zoology, I owe a great deal for their kindness and cooperation in the preparation of this paper.

In the following discussion all measurements are in millimeters; the wing is measured pressed as flat as possible against the ruler; the culmen is measured from the tip of the nail to the point where the forehead feathers commence between the nasal ridges. By the term mandible, I refer to the lower (mandibular) half of the bill.

THE SPECIES *Anas castanea*

Within this species I have included six races formerly considered to belong to the species *castanea, gibberifrons* and *albogularis* (Peters, 1931). The distribution of the species extends from the Andaman Islands to New Zealand and includes most of the East Indian islands and Australia. The nearest relative seems to be *Anas bernieri,* a shy, rare little duck from Madagascar. I have not been able to dissect any specimens of *A. bernieri,* however, in order to determine whether that species also possesses the curious frontal-sinus enlargement of *castanea.* Simply from external appearances, it does not seem to have any particular swelling in that region. Presuming, nevertheless, that *bernieri,* on account of similar coloration, is related to *castanea,* this points to an Asiatic origin for these rather primitive-appearing ducks.

ANAS CASTANEA CASTANEA (Eyton)

Mareca castanea Eyton, Monogr. Anatidae, p. 119, pl. (19), 1838.
Virago castanea alexanderi Mathews, Austral Avian Record, 3: 56, 1916.

Description.—Adult male: head and neck dark iridescent green, sometimes with a few brownish feathers irregularly on the throat; mantle and back blackish, the feathers edged with chestnut; rump and tail black with an indistinct greenish gloss; breast and abdomen chestnut, the feathers of the lower breast, abdomen and belly with black subterminal spots; posterior part of the flanks white, connected across the vent by a narrow band of white, with irregular blackish vermiculations. The wings are dark brown, the speculum is iridescent purple with a central green band, bordered with brownish white. Iris crimson; bill lead gray; the anterior half of the mandible yellowish; feet olive gray to lead color.

Adult male (eclipse): a specimen (Mus. Comp. Zool. no. 13015) collected in February 1869, at Mongup, Western Australia, seems to be just beginning to assume nuptial plumage. The head and neck are gray-brown with streaks of new greenish feathers on the crown and malar region. The feathers of the back are dark brown with pale edges. The tail-feathers are brown with new blackish-brown iridescent feathers still in their sheaths. The breast consists of mixed feathers, some brown with pale edges, others chestnut. The under parts are more nearly uniform brownish. A few of the chestnut feathers have black subterminal spots just appearing, and there are a few vermiculated feathers in the vent and posterior flank region.

A male bird (U. S. Nat. Mus. no. 278784) collected on Kangaroo Island, January 24, 1920, seems to belong to this form and to be in total eclipse plumage (see female) for there is no trace of the nuptial plumage. In size it conforms very well with *castanea*, having a tail measurement of 94 mm., which is longer than in any specimen of *mathewsi*.

Another male (Amer. Mus. Nat. Hist. no. 732060) collected in New South Wales in November 1873, seems to have been very slow in attaining nuptial plumage for there are still a few eclipse feathers on the throat, back, rump and tail. This seems to be unusual, however, for there are specimens in full plumage from March through December with the eclipse apparently occurring in January and February.

Adult female: crown and nape dark blackish brown (sometimes greenish) edged with pale brown; back, rump and tail dark brown edged with pale brown; throat and neck whitish; breast and belly pale brown barred subterminally with dark brown; flanks and vent brown indistinctly edged with pale brown; wings, iris, bill and feet as in the male.

Measurements.—Male: wing, 204–231 (214.5) mm.; tail, 87.5–107 (93.3); tail-wing index, 40–48 (43) %; culmen, 39.5–42.5 (40.5). Female: wing, 197–209.5 (202.9); tail, 80–87.5 (84); tail-wing index, 40–42 (42) %; culmen, 37–41.5 (38.6).

Range.—South Australia, Tasmania (see Text-fig. 1).

Specimens examined.—Thirty-seven.

Discussion.—On the map (Text-fig. 1) I have shown all the localities at which undoubted specimens of this form have been secured. From this evidence it is apparent that *castanea* is limited to the southern parts of Australia where the combination of twenty inches or more

of rainfall plus a temperate climate with contrasting seasons, has apparently been favorable to a definite breeding season. As a result of this it is possible for the males to have a cycle of molts stimulating the assumption of a nuptial plumage. If the distribution of these birds has been correctly interpreted as spreading out from Asia, one may suppose that the original ancestor of *castanea* in temperate Asia had a nuptial plumage the genes for which have been carried in a repressed condition ever since. Given the proper stimulus, it has eventually been possible for a nuptial plumage to make a reappearance in the species. Mr. Delacour writes that it is his impression that males of *castanea* never go into full-eclipse plumage (in captivity). This is a point which should be settled by observation of birds in the field.

ANAS CASTANEA MATHEWSI Phillips

Anas gibberifrons mathewsi Phillips, A Nat. Hist. of the Ducks, 2: 266, 1923 (new name for *Nettion castaneum rogersi* Mathews, Austral Avian Record, 1: 86, 1912, preoccupied by *Anas superciliosa rogersi* Mathews).

Anas gracilis Buller, Ibis, (2) 5: 41, 1869.

Description.—Adult male: head, nape, back and tail dark brown edged with light buff; cheek-feathers grayish brown with a central darker streak; throat and neck pale buffy brown to white (worn); breast and under parts generally grayish to buffy brown with brown centers to the feathers; wing as in *castanea*. Iris crimson to red; feet pale gray to black; premaxilla black to bluish; mandible dark gray, distal half orange.

Female: colored as the male.

Measurements.—Male: wing, 194–209.5 (203.5) mm.; tail, 77.5–90 (85.5); tail-wing index, 40–43 (42) %; culmen, 36–41 (38.4). Female: wing, 193–203 (198); tail, 79–93 (85.5); tail-wing index, 40–46 (43) %; culmen, 34.5–39.5 (37).

Range.—Northern Australia (see Text-fig. 1), New Zealand, New Caledonia, New Guinea, Aru and Kei Islands.

Specimens examined.—Forty-one.

Discussion.—From the above measurements it will be seen that *mathewsi* may be distinguished from *castanea* on the basis of generally smaller proportions. Aside from this, I can find no constant characters of color or structure. It is interesting to note, however, that judging from the seventy-eight specimens of both forms examined, there do seem to be two distinct ranges occupied by the two forms as shown on the map (Text-fig. 1). A few recent records such as that of McMicking (1925), indicate that *mathewsi* may breed throughout New South Wales and thus overlap the range of *castanea*, but more careful field work is needed on the actual breeding ranges of the two forms.

The contrast between the plumages of these two forms is most

interesting and reminiscent of that described by Mayr (1940) for the eclipse plumage of *Lalage tricolor*. Here again is an instance of two closely related populations of a species in which speciation has occurred in an ecotypic manner, to use Turresson's term. It differs from ordinary ecotypic differentiation such as that described by Dice

TEXT-FIG. 1.—Map of Australia showing the localities at which the specimens examined were secured. An open ring shows a locality for *Anas c. castanea;* a black square marks a place at which *Anas c. mathewsi* was taken. The small number of localities on the map is explained by the fact that many of the specimens came from the same place (nine specimens of *mathewsi* from Normanton, northern Queensland, for example) while others were from unidentifiable localities or marked simply 'Melbourne market.'

(1939) for populations of the cactus mouse, *Peromyscus,* where soil color apparently affects coat color. In this case, the difference is presumably due to the fact that the gonads of the tropical and arid-range male *mathewsi* are in near-breeding condition the year round, for it apparently breeds at all seasons, particularly after heavy rain (Phillips, 1923). The result of this activity is that the male plumage becomes permanently suppressed, a condition somewhat akin to that

of the Sebright fowl described by Morgan (1919). That this condition is now genetic and not simply environmental is shown by the fact that the birds which have reached New Zealand are evidently *mathewsi* (Oliver, 1930). I have examined two specimens from New Zealand and can find no size or color differences to support the name *gracilis*.

The range of *mathewsi* in New Caledonia is still problematical as the records are very old (Verreaux and Des Murs, 1860). Recently Macmillan has collected on New Caledonia for the American Museum but failed to find this duck (Mayr in litt.).

Dr. A. L. Rand has very kindly shown me two specimens of this duck taken by him on the recent Indisch-Amerikaansche Expeditie to Netherlands New Guinea at Lake Habbema (altitude 3225 m.). In their measurements and coloration they agree exactly with Australian specimens of *mathewsi*.

A female of *mathewsi* from Toeal, Little Kei Islands (Amer. Mus. Nat. Hist. no. 732079) is small (wing, 193). However, its plumage, though worn, is still paler than that of *gibberifrons*, and it also lacks the prominent swelling of the frontals so characteristic of the latter form.

I have not seen any birds from the Aru Islands from whence they are recorded by Meyer and Wiglesworth (1898) but they presumably belong to this form.

Anas castanea remissa new subspecies

Type.—No. 224659, American Museum of Natural History, adult male, from Rennell Island, southern Solomon Islands; collected September 4, 1928, by Hannibal Hamlin.

Subspecific characters.—Differs from *mathewsi* by being much smaller; color of the breast, abdomen, flanks, belly and under tail-coverts darker, more buffy; the feathers of the under side of the neck with dark central streaklets.

From *gibberifrons* this race differs by having a smaller bill, by lacking the distension of the frontal sinuses and by the streaked appearance of the under side of the neck. The pale margins on the feathers of the back and the scapulars are paler than in September specimens of *gibberifrons* from Celebes.

The adult female differs as the male.

Measurements.—Male (type): wing, 186.5 mm.; tail, 79; tail-wing index, 42%; culmen, 33. A female measures: wing, 179.5; tail (molting), 74; culmen, 33.

Range.—Rennell Island, Solomon Islands.

Discussion.—This little duck is found on an island renowned for its endemic fauna including a distinct grebe and cormorant. Geographically its position is interesting as it is completely surrounded, though at some distance, by *mathewsi* found in New Guinea and New Caledonia. Mayr (1931) felt that *mathewsi* and *gibberifrons* were

overlapping in size and that these Rennell birds agreed with *gibberifrons*. He failed to note, however, the lack of development of the frontal sinuses which form such a distinctive character separating *mathewsi* and *remissa* from *gibberifrons*.

ANAS CASTANEA GIBBERIFRONS S. Müller

Anas (Mareca) gibberifrons S. Müller, Verh. Nat. Ges. Nederl. Land-en-Volkenk., p. 159, 1842.

Description.—Adult male: crown, nape, back and scapulars dark blackish brown, the feathers edged with buffy brown. Cheek-feathers buffy with central brown streaks; throat and neck pale buff; breast and under parts generally rich buffy brown with dark-brown centers to the feathers; wing as in *castanea*.

Iris crimson to brown, feet gray-blue to dark brown, bill lead-blue to grayish blue, distal half of mandible orange-brown.

Female: colored as the male.

Measurements.—Male: wing, 181–200.5 (190.8) mm.; tail, 78–91.5 (85); tail-wing index, 42–46 (45) %; culmen, 35–40.5 (38). Female: wing, 178–187 (182.4); tail, 75–86 (78.2); tail-wing index, 40–46 (43) %; culmen, 34–41 (36.5).

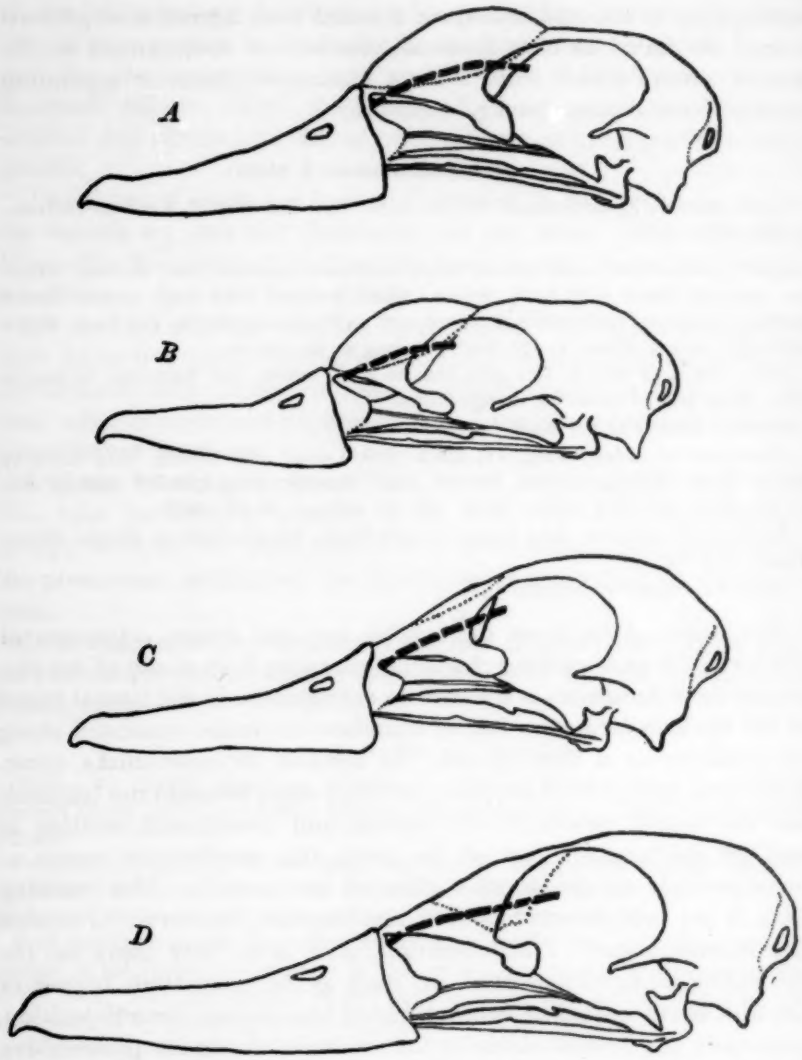
Range.—Java, Celebes, Sula Islands, Lesser Sunda Islands; Saleyer, Sumba, Flores, Timor and Wetar.

Specimens examined.—Thirty-two.

Discussion.—Aside from the smaller size and darker coloration of this form, the most striking character separating it from any of the preceding three subspecies is the curious enlargement of the frontal bones of the skull to form two frontal chambers or sinuses separated along the mid-line by a thin septum. In contrast to other ducks (*Anas boschas, A. acuta*) in which there are often septa between the lacrimals and the ventral process of the frontals and mesethmoid, tending to wall off the anterior part of the orbit, this development seems to occur entirely on the dorsal surface of the frontals. The resulting sinus is not only directed upward and outward, but serves to depress the frontal bones. This condition must arise very early in the embryological development of the duck as the ophthalmic branch of the fifth nerve instead of being deflected into a more ventral position, penetrates the frontal sinus by an antorbital foramen, passes along the floor of the sinus and out by another foramen in the anterior part of the sinus floor into the turbinal region (Text-fig. 2).

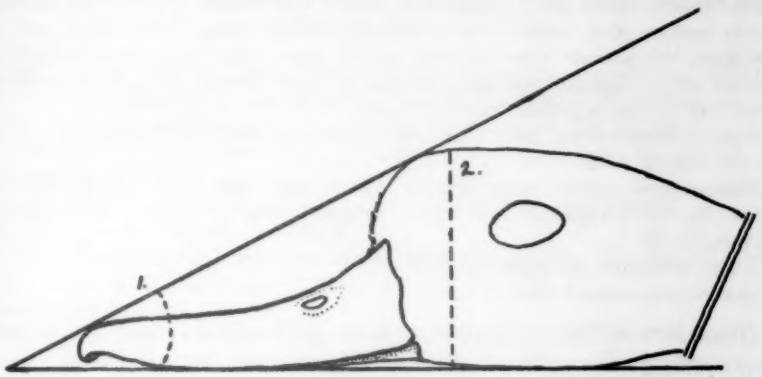
This sinus development is not by any means limited to males as Phillips (1923) suggests, but is present in females also as the figures show. A juvenal female (Mus. Comp. Zool. no. 270325) collected on Peleng Island in September 1938, has a pronounced frontal bulge.

In an attempt to express this character in terms of measurements, I have measured the angle between two lines, one running along the



TEXT-FIG. 2.—Skulls of (A) *Anas c. gibberifrons,* male, M. C. Z. 270,043; (B) *A. c. gibberifrons,* female, M. C. Z. 270,042; (C) *A. c. mathewsi,* male, M. C. Z. 170,010; and (D) *A. acuta,* M. C. Z. 2310, showing the striking development of the frontal-sinus area in A and B and its reduction in C to the area enclosed by dotted line. The typical condition in *Anas* is shown in D, in which the dotted line indicates an incomplete lacrimal-frontal septum. The heavy broken line follows the path through this region, of the ophthalmic branch of the fifth nerve.

ventral side of the mandible and the basicranial projection, the other from the nail of the bill along the frontals (Text-fig. 3). The size



TEXT-FIG. 3.—Outline to show method of measuring angle of forehead and depth of head.

of this angle is represented in Text-fig. 3 by the dotted line numbered 1. In order to check on this measurement I have also taken the distance in millimeters from the mandibular bone to the top of the frontal sinus as shown by the dotted line numbered 2. A list of the measurements follows:

Species	*Angle no. 1*	*Distance no. 2*
Anas c. castanea	♂ 20–25 (21.9) deg.	24–30 (27.6) mm.
	♀ 18–25 (21.4)	25–29 (27.3)
Anas c. mathewsi	♂ 20–25 (21.2)	23–29.5 (27.3)
	♀ 19–22 (20.1)	21.5–27.5 (24.8)
Anas c. remissa	♂ 22	22
	♀ 23	22
Anas c. gibberifrons	♂ 26–33.5 (29)	27–33.5 (29.5)
	♀ 29–30 (29.2)	26–30 (28.7)
Anas c. albogularis	♂ 22–24 (23)	25–28.5 (26.6)
	♀ 20, 23	22, 24
Anas c. leucopareus	♂ 23–28 (25)	29–31 (30)

From these measurements it will be seen that there is a well-marked difference between the development of the sinuses in *gibberifrons* and that in *mathewsi, remissa* or *castanea.* This condition is not only readily appreciable to the eye, but may be felt by running the thumb over the forehead area of the skins.

ANAS CASTANEA ALBOGULARIS (Hume)

Mareca albogularis Hume, Stray Feathers, 1: 303, 1873.

Description.—Adult male: above dark brown with brown edges to the feathers, cheeks uniform dark brown, a white eye-ring broader below, throat, neck and (in one male) the anterior nares whitish, rest of under parts as in *gibberifrons*. Iris reddish brown, legs and feet greenish blue to slate colored, bill slate colored, the distal half of the mandible "pink" (Hume).

Female: colored as the male except for a reduced eye-ring and lacking the whitish on the anterior nares.

Measurements.—Male: wing, 199–201 (200.2) mm.; tail, 78–79 (78.5); tail-wing index, 33, 34%; culmen, 34–36 (35). Female: wing, 197, 205.5; tail, molting; culmen, 34, 36.

Range.—Southern Andaman Islands.

Specimens examined.—Six.

Discussion.—This race differs from *gibberifrons* only in slightly larger size, darker color of the upper surface of the body, dark cheeks and the white ring around the eye. The frontal-sinus development is quite apparent, however. It is strange that *gibberifrons* has never been recorded with certainty from Sumatra. Whatever the reason for this, the isolation of the Andamans has resulted in the speciation of the Grey Teal resident there into two poorly marked races, characterized principally by their tendency to albinism.

ANAS CASTANEA LEUCOPAREUS (Fleming)

Polionetta albogularis leucopareus Fleming, Proc. Biol. Soc. Washington, 24: 215, 1911.

Description.—Adult male: differs from *albogularis* principally in the white nares, cheeks and post-ocular patches, and in the white ring around the neck.

The female is said to differ as the male.

Measurements.—Male: wing, 201, 204, 204.5 mm.; tail (molting), 81; tail-wing index, 40%; culmen, 35, 36, 36.

Range.—North Reef and Middle Andaman Islands, Andaman Islands.

Specimens examined.—Three males.

Discussion.—This race apparently differs from the preceding one by an increased amount of albinism on the head which has become fixed in a definite pattern. It is perhaps a questionable distinction but so long as it can be shown to be constant, will have to stand. There seems to be, in the three specimens measured, a slightly greater enlargement of the frontal sinuses than in *albogularis*.

LITERATURE CITED

DICE, LEE R.

1939. Variation in the cactus-mouse, *Peromyscus eremicus*. Contrib. Lab. Vertebrate Genetics, Univ. Michigan, no. 8: (see p. 9).

MAYR, ERNST

1931. Birds collected during the Whitney South Sea Expedition. XIII. A systematic list of the birds of Rennell Island with descriptions of new species and subspecies. Amer. Mus. Novitates, no. 486, 29 pp.

1940. Notes on Australian birds. 1. The genus *Lalage*. Emu, 40: 111–117.

MCMICKING, F. V.

1925. Grey Teal (*Virago gibberifrons*) in the Riverina. Emu, 25: 19.

MEYER, A. B., AND WIGELSWORTH, L. W.

1898. The birds of Celebes and the neighbouring islands. 4to, Berlin, 2 vols., 45 pls.; R. Friedländer & Sohn (see vol. 2, p. 874).

MORGAN, THOMAS H.

1919. The genetic and the operative evidence relating to secondary sexual characters. Carnegie Inst. Washington, publ. 285, 108 pp., 10 pls.

NEWTON, ALFRED

1871. On a remarkable sexual peculiarity in an Australian species of duck. Proc. Zool. Soc. London, 1871: 649–651, 2 figs.

OLIVER, W. R. B.

1930. New Zealand birds. 8vo, viii + 541 pp., illustr.

PETERS, JAMES L.

1931. Check-list of birds of the world. 8vo, vol. 1, xviii + 345 pp.; Cambridge, Mass., Harvard University Press.

PHILLIPS, JOHN C.

1923. A natural history of the ducks. 4to, 4 vols., Boston.

VERREAUX, JULES, AND DES MURS, O.

1860. Description d'oiseaux nouveaux de la Nouvelle-Calédonie et indication des espèces déjà connues de ce pays. Rev. et Mag. de Zool., (2) 12: 431–443.

Litchfield, Connecticut

GENERAL NOTES

A new Gannet colony in Newfoundland.—A colony of approximately two hundred nests of the Gannet (*Moris bassana*) was found on a cliff on the eastern side of Bacalieu Island, Newfoundland, on June 24, 1941. This rocky island lies several miles offshore from the small fishing village of Bay de Verde, at the northernmost tip of the Avalon peninsula, and in the mouth of Conception Bay. Old residents told me that the Gannets have been there for about forty years, but the colony has not been before recorded. Mr. H. M. Froude and two other employees of the Newfoundland Department of Natural Resources visited this colony with me. As a matter of interest we found about 25,000 Kittiwakes (*Rissa tridactyla tridactyla*), 10,000 Atlantic Murres (*Uria aalge aalge*), 5,000 Atlantic Puffins (*Fratercula arctica arctica*), and about 750 Black Guillemots (*Cepphus grylle grylle*) also nesting on this island, most of them on the bold eastern side facing the sea.—HAROLD S. PETERS, *U. S. Fish and Wildlife Service, R. F. D. No. 1, Charleston, South Carolina.*

Cormorants found breeding on Prince Edward Island, Canada.—A mixed colony of Double-crested Cormorants (*Phalacrocorax auritus auritus*) and European Cormorants (*Phalacrocorax carbo carbo*) was found at Cape Tryon, Queens County, Prince Edward Island, Canada, on June 11, 1941. About 100 nests, approximately 25 being of European Cormorants, were constructed on a cliff about 110 feet high, and facing the sea, near the lighthouse at the western entrance of New London harbor, as nearly as could be determined in approaching darkness and a very strong wind at the time of my visit. Mr. W. A. Reddin, Prince of Wales College, Charlottetown, Prince Edward Island, and Col. H. H. Ritchie, Chief Game Warden of New Brunswick, accompanied me to this colony. This is believed to be the first record of either species of cormorant nesting on Prince Edward Island. Since the colony was not known when Lewis wrote his paper on the population of European Cormorants in North America (Auk, 58: 360–363, 1941) an additional fifty breeding individuals of this species can be added to his total.—HAROLD S. PETERS, *U. S. Fish and Wildlife Service, R. F. D. No. 1, Charleston, South Carolina.*

Trumpeter Swans in British Columbia.—Mr. John P. Holman, of Fairfield, Connecticut, President of The Audubon Society of the State of Connecticut, is authority for the statement that a flock of Trumpeter Swans (*Cygnus buccinator*) spends every winter on the sloughs of a river in British Columbia. Hearing of this flock in 1925 while on a hunting trip around the headwaters of this river, he was instrumental in getting the Canadian authorities to appoint as custodian of the swans the settler who had informed him of their whereabouts. In his book 'Sheep and Bear Trails' (1933), published by Frank Walters, Grand Central Palace, New York City, Mr. Holman devotes 42 pages to publishing letters written by this settler, in which the welfare of the swans is frequently mentioned. In 1925, the flock numbered seventy individuals. They usually arrive in November and depart for the north in April. The custodian has fed the birds during the severe winters. The late Dr. E. W. Nelson, former Chief of the U. S. Biological Survey, and an old friend of Mr. Holman, was greatly interested in this flock. In 1926, there were 150 swans in the locality. Quotations from these letters follow.

February 26, 1926.—"The swan came down in November. They are certainly a beautiful sight rising from the lake airplane-wise, tooting their trumpets as you

might say, snowy white in V-formation. It takes them about 100 yards to get up enough speed to pull in their toes or running gear. Their tracks become less and less until only a toe mark is the last. To start with, their wings mark the snow also."

April 10, 1927.—"Trumpeters are gray the first season and white afterward. After real hard winter sets in the flocks comprise only about 30 to 40 individuals. As the ice conditions become worse they scatter all along the river in every patch of open water, where in the fall they wouldn't think of going. Many flocks consisted of two white ones and about six grey ones flying together and feeding separately from the other groups. Now we see more white with only an occasional grey one. I have noticed during the hard winters that the grey ones fall prey to the eagles and starvation before the white ones. This winter I have seen two cases of eagles killing swan. The eagles do not seem to be able to catch the swan when they are stronger or on a straight-away flight.

"In former years the swan have been almost exterminated on account of persistent ice on the river as well as on the lakes. One year my brother took the swan that had starved until flight was impossible and fed them on cabbage a short while. When their strength returned they flew away. Walter . . . told me he knew of four swan deaths at Stillwater last winter and many more were unable to fly for some time."

June 30, 1930.—"The swan are here from November until April. This year they left a month earlier than usual."

April 16, 1931.—"The swan had things all their own way this year and left for the north unusually early this spring. I noticed no losses in their ranks at all."

November 1, 1931.—"The swans, seven of them, flew low over our place two or three days ago, the first we've seen this fall."

May 7, 1932.—"The last swans left April 12th. We had a hard winter for them, apparently, as eleven that we know about died of starvation or disease or eagles. All young ones. In the fall there were some thirty young ones to every thirty old ones. The black bears broke Max . . . 's cherry trees down this summer. The old bear was up in one of the trees throwing down cherries for the youngsters."

May 6, 1933.—"The swans had a pretty good winter up to January 20th when a long cold spell made them glad of a little grain. I fed four sacks of barley to them, broadcasting it on their natural feeding grounds in about two or three feet of water. They got on to it very quickly. Only two youngsters died that I know of. There were fifty or sixty birds in here last winter including about eighteen young ones."

Letters received from Edwards since the publication of Mr. Holman's book contain the following notes on this flock of Trumpeters.

March 10, 1934.—"Our swans had a wonderful winter; no trappers at the Stillwater to scare them off their feed and very little ice on their lake feeding grounds. I counted 62 on the lake today."

March 10, 1935.—"The swans had a few losses but the weather was mostly favorable to them. There were about seventy at one time on the lake and they certainly made a beautiful sight."

July 3, 1935.—"We are moving 400 pounds of barley up to the Stillwater for swan food. The government buys the grain and I pack it in *gratis*."

November 28, 1935.—"The swans are feeding on the lake with a lot of geese and ducks."

January 10, 1936.—"We have had an unusually mild winter so far this year. Some sixty or more swan and a lot of geese all wintering with us. The Canadian government is paying me a little to look after the swans and feed them when necessary."

August 7, 1936.—"The Trumpeter Swans gave us a count of 110 last winter on one day of census-taking. They had some fatalities but a good proportion of the cygnets went north in the spring."

April 18, 1937.—"The swans had a very hard time of it this winter in spite of the eight sacks of barley we packed in for them. Of course eight sacks would not go very far for a large number of these birds when they are unable to get other food. There were about fifty of them feeding in little open places at the head of the . . . lake at the beginning of winter, in among the willows and slough grass. Their usual feeding grounds were under water on account of the flood. From about December 15 to February 15, all the creeks and lakes were frozen over. During this time the swans had only fibrous roots and salmon vertebrae to feed on as the river had been swept clean by the big flood of November.

"I went down every two weeks and fed them a half sack of barley or so but it was not often enough to do much good. When warmer weather permitted the river near home to thaw out a little we found a swan sitting on the water unable to fly. We hustled some barley into the river and two more swans came in that evening. Next morning we were there and fed more grain and all three flew up, returning in the afternoon with others. We kept feeding them for about a month until the barley was all gone but by that time enough water had opened up to allow them to feed on natural food. During all this time we were working on an addition to our barn and the swans paid no attention to our pounding. The largest count of any time after the freeze-up was twenty-two, all adults. The cygnets all succumbed. Some of the adults also died or fell prey to eagles and wolves. We found that it took about 10 pounds of barley a day to feed twenty-two swans. At least they cleaned up that much but no doubt they would have eaten more if they had had it. Anyway ten pounds kept them able to fly and move about.

"Trumpeter Swans have a special song that they sing just before they start for the north. They sing all night with a peculiar cadence to rhyme with the words 'going over the river' which they repeat over and over again. The next morning they start away in a body leaving only the weaker ones behind to build up strength to follow."

February 4, 1938.—"We have had a comparatively mild winter so far and the swans are doing finely. The largest count totalled fifty birds. About forty of them stay around. . . . I am feeding them a little grain now as their feeding grounds are still much restricted by high water, but conditions are much better than last year and we have hopes of getting them through without much loss. Time will, to a certain extent, remedy their present difficult position as water flora and fauna take over the inundated areas and Nature restores their natural food."

February 18, 1940.—"The big Trumpeters are here as usual, 49 being the largest count so far. About 14 cygnets. Have not had to feed them so far, but they are getting short of natural food now and they are flying about over the Birches and river looking for barley."

Comment: This series of letters, covering a period of fifteen years, vividly portrays the struggle for existence waged by this species against adverse conditions. Seeking the protection of an isolated and almost inaccessible wilderness for winter

quarters, the swan's chief difficulty is in finding access to food in the few patches of water remaining open during the winter. In any season of unusual severity these openings freeze over and the swan starve. As is usual in all species, the first to succumb are the young, and only the most hardy of these young birds live through to replace the species.

Precariously holding their own against starvation and natural enemies including eagles, wolves and coyotes, the swan were nearly overwhelmed by the effects of the great flood of 1936 which brought down rock slides, dammed the outlet and raised the water level of their lake and thus destroyed their feeding grounds. From 110 in the winter of 1936, the number dropped, as shown, to twenty-two. Yet the species survived, with the loss of all its young, and is again building up to its maximum, limited by food supply, of about one hundred birds. It is needless to point out what the effect on its survival would be if man were added to its list of natural enemies. For this reason the names of localities in the note have been omitted. It is the policy of the Canadian Government not to advertise the whereabouts of rare species threatened with extinction.—H. H. CHAPMAN, *205 Prospect Street, New Haven, Connecticut.*

Gadwall in Center County, Pennsylvania.—The status and range of the Gadwall (*Chaulelasmus streperus*) in Pennsylvania have not been well investigated except in the farthermost western counties of the State (Todd, 'Birds of Western Pennsylvania') and in some few of the eastern counties. For example, in Berks County, Earl L. Poole reports: "An uncommon transient and winter resident at Lake Ontelaunee. I have thirty-two records between Oct. 14, 1932, and May 30, 1939, from single birds to groups of ten." And also from Chester County, Albert E. Conway has published two records of the bird in his 'Check List of Birds of Chester County' (1940): "Rare transient. December 26, 1912, near Kennett Square (Pennock & Thomas) and April 17, 1937, Brandywine (Copes)."

Todd mentions records of the bird in western Pennsylvania, including breeding records at Pymatuning. He states that because of the lack of evidence he does not believe that the bird's range extends into central Pennsylvania.

Therefore, in view of the fact that we know the bird to be an uncommon transient in the vicinity of State College (Center County), we would like to present the several sight records which we have from our own records and from records which have been turned over to us from reliable sources in this vicinity.

All these records were made on a pond which is approximately three acres in area. This is located on the eastern edge of the borough of State College, Pennsylvania, on land belonging to the Pennsylvania State College. This is a protected area, and on this account the ducks which come there may often be closely approached. In some cases the Gadwall was approached within twenty yards, and in none of the following records was the distance greater than sixty yards.

The descriptions made in the field by the different observers, independently, were checked against one another. Three observers (Curry, Holzman, Yerger) are familiar with the bird in the Middle West.

State College, Pennsylvania, March 29, 1939, one male, studied closely with 8-power glasses at 50 yards; black under tail-coverts, white speculum, neck thinner than in Black Ducks with which it was associating; made it fly several times to get wing pattern (Holzman). November 15, 1940, one male (black under tail-coverts seen distinctly) (R. Yerger, W. Currier). November 16, 1940, one male (Yerger and Holzman). November 17, 1940, one female or young male (Curry).

November 19, 1940, one male (G. Free). November 23, 1940, one male. November 24, 1940, two females and one male. November 25, 1940, two females (R. Giegler). December 5, 1940, one male (Currier).

All the males seen between November 15, 1940, and December 5, 1940, may have been the same bird.—JAMES H. HOLZMAN AND HASKELL B. CURRY, *Pennsylvania State College, State College, Pennsylvania.*

European Widgeon at the Upper Souris National Wildlife Refuge.—Because of the limited number of records of the European Widgeon in the interior country it seems appropriate to report that on July 29, 1941, a male European Widgeon, *Mareca penelope*, was observed on Unit 96, Upper Souris National Wildlife Refuge, near St. Mary's Crossing, North Dakota.

The bird was in a mixed flock of Mallards, Pintails, and Baldpates, and was observed through 9-power glasses at about one hundred yards. The differences between the European Widgeon and the American Baldpates were readily recognizable. The bird was seen both on the water and in flight.—CLARENCE COTTAM, *U. S. Fish and Wildlife Service, Washington, D. C.*

Pintail in the Dominican Republic.—In our account of the birds of Haiti and the Dominican Republic (Bull. U. S. Nat. Mus., no. 155: 100, 1931) B. H. Swales and I recorded the Pintail (*Dafila acuta tzitzihoa*) as of uncertain status. Mr. Hugh A. Johnston of Monte Cristi, under date of July 10, 1941, writes me that last winter migratory ducks were present in his vicinity by thousands, passing over his house in flocks that at times literally stretched across the entire sky. His observation was that the majority appeared to be the Pintail. Birds that a friend and he shot were mainly of that species, though including a few Blue-winged Teal (*Querquedula discors*). As Mr. Johnston is familiar with ducks the record may be accepted to validate the occurrence of this species on the island. The numbers in which it was present were a matter of some surprise.—ALEXANDER WETMORE, *U. S. National Museum, Washington, D. C.*

Bartram's Painted Vulture.—Francis Harper has discussed references to this bird at length (Auk, 53 (4): 381–392, Oct. 1936) but failed to note one that suggests a better solution of the puzzle than that which he adopted. In the light of the evidence he collected, Harper proposed that *Sarcoramphus papa* L. be recognized as formerly having occurred in Florida. The authority to whom I refer is R. P. Lesson who in his 'Traité d'Ornithologie' (1831: 26) says, "The bird described by Bartram under the name of *Vultur sacra*, seems to be a variety, tending to albinism, of this species." The tendency of birds to form Floridian subspecies being amply evident, why is it not the best course to regard the extinct Painted Vulture as a subspecies of the King Vulture and call it *Sarcoramphus papa sacra*, the authority for which should be Lesson *ex* Bartram, who under the rules will be the first strictly binomial author to give the name currency?—W. L. MCATEE, *U. S. Fish and Wildlife Service, Washington, D. C.*

Fuertes's Red-tailed Hawk in Northern New Mexico.—On August 15, 1940, an adult female Red-tailed Hawk (*Buteo jamaicensis*) was collected by the writer six miles east of Colfax, Colfax County, New Mexico. The specimen is now no. 9284 of the Fuertes Memorial Bird Collection at Cornell University, and has been identified by Dr. George M. Sutton as *Buteo jamaicensis fuertesi* Sutton and Van Tyne (Occas. Papers Mus. Zool., Univ. of Michigan, no. 321, September, 1935).

As the type locality of this well-marked race is in Brewster County, Texas, the occurrence of a specimen so far north in New Mexico may well occasion surprise. The bird collected was not in breeding condition, however, and its presence so far from the previously known range of *fuertesi* may have been due to some chance wandering. No additional Red-tails were taken in this area, but others seen did not impress the writer as being so lightly marked below as *fuertesi*, a character which the authors of the race state to be clearly discernible in the field. Several very dark birds seen appeared to be *B. j. calurus*, which is probably the breeding form of the region. At least they could hardly have been *fuertesi* since that Texas race is apparently not dichromatic. Not knowing of any previous records of Fuertes's Red-tailed Hawk in New Mexico, the writer deemed it advisable to publish this note, regardless of what significance the record may have as far as the breeding range is concerned.—ROBERT M. MENGEL, *Cornell University, Ithaca, New York.*

Eagles of western Illinois.—There has been no recent publication of data dealing with the winter migration of eagles to western Illinois. Scattering notations on eagles taken from my Nature calendar, may be of some interest.

Three-quarters of a century ago huge slaughter houses were located on the Mississippi River near Keokuk. Prime meats were packed and lard was rendered while the carcasses, fats, and meat scraps were thrown into the river. Open water at the base of the Des Moines rapids contributed to the ease of securing fish which together with the presence of this offal from the slaughter house, attracted large numbers of eagles. These occasionally carried on their depredations even on inland farms, wandering as far south as Clarksville, Missouri. The following clipping from a Warsaw, Illinois, paper published about 1912 gives interesting local color to the status of the eagles years ago and then:

"The presence of a pair of eagles above the river recalls the days of half a century ago when the locality where these birds are now seen was simply alive with eagles which were attracted by the offal discharged into the river from the pork houses at Keokuk.

"The 'Plough Boy' was operating between Keokuk and Warsaw at that period and the big birds would come so close to the craft in retrieving the floating food that they became the object of curiosity to the passengers who marvelled at the strength exhibited in lifting from the water, loads of fat and decomposed meats, apparently larger than [the birds] themselves."

Time has passed. The slaughter houses are gone. The great Keokuk Dam crosses the river. Open water acts as a constant attraction to gulls, ducks, and waterbirds throughout the winter. Most noticeable of the visitors are the eagles, which continue to make their yearly trips to the ancient site of winter plenty.

This flock of Bald Eagles (*Haliaeetus leucocephalus*) usually numbering from five to ten, hunts south of the dam and roosts in the big sycamore trees which line the river bank between Hamilton and Warsaw. They have an abundance of food in the form of carp and hickory shad which are killed during the ice period of the winter. The big birds are usually preyed upon by embryo hunters, correspondence-school taxidermists, and likewise by an older man who kills them in order to sell the feathers to a western firm which finds a ready market for the plumage among Indian tribes. The slaughter has totaled from two to four birds yearly for a number of years. Yet the eagles persist. From Keokuk, the eagles wander south along the river for seventy-five to a hundred miles.

On October 26, 1929, a Quincy duck-hunter named Ed Hagerbaumer was surprised when a mature Bald Eagle dropped in to his decoys killing one bird. He shot the eagle which was one of the largest I have seen: wing spread 7 feet 3 inches, weight 11 pounds, with fine white head and tail.

November 18, 1929, John Badamo killed a mature Golden Eagle (*Aquila chrysaëtos canadensis*) which had attacked his chickens. Wing spread 7 feet, weight 9 pounds. The golden head-feathers were particularly fine. The tarsi were covered with short white feathers. It was neither so large nor so heavy as the Bald Eagle killed three weeks earlier.

November 18, 1930, a Golden Eagle was killed by a farmer across from Hannibal, Missouri, twenty miles south of Quincy. Chickens again seemed to be the lure.

In November 1932, an immature Bald Eagle sailed over a duck blind at the mouth of Mill Creek and was killed by Roy Hussong.

February 1933, two immature Bald Eagles spent most of the winter on Long Island, five miles north of Quincy. I recorded them twice during that month.

On February 22, 1933, I was watching a large congestion of ducks which alighted on the ice near Warsaw, Illinois. There were Mallards, Pintails, Goldeneyes, and American Mergansers. Imagine my surprise upon seeing three mature Bald Eagles standing upon the ice pulling dead fish to shreds. The ducks were walking about within a few feet of these great birds of prey. They seemed to have no fear whatsoever of the eagles as long as they were standing or walking about on the ice, but the moment the eagles raised their wings for flight there was a general exodus of ducks from that neighborhood.

May 21, 1933, while hiding in a blind at Duck Island Hunting Club at Banner, Illinois, taking pictures of the feeding of young Great Blue Herons, a mature Bald Eagle sailed into the swamp intent upon securing a fat young bird for breakfast. A solitary old heron flew out to meet it, with head laid back and its saber-like bill ready for action. At the moment of contact, the eagle dove and the heron circled, keeping between the enemy and the young birds. The eagle settled in a dead pecan-tree, bordering the swamp, where it watched for an opportunity to snatch its breakfast. However, the Tree Swallows, Prothonotary Warblers, and Red-winged Blackbirds mobbed the unwelcome intruder, forcing it to evacuate without a meal. Although this was a mature bird, I could get no information about an aerie anywhere in the neighborhood. My companion and assistant in photography on that occasion was W. L. Angus, teacher of biology in Quincy High School.

Spring of 1933, a farmer at Taylor, Missouri, noticed a big bird taking his chickens. He killed the culprit—an immature Bald Eagle which is mounted in Stratman's Gun Company window.

November 20, 1933, perhaps the most unusual experience of all occurred when two young farmers brought me a sack, containing a live but badly wounded Bald Eagle. They reported having been 'coon hunting with dogs, gun, and powerful focusing flashlights in the wooded swamps near Lima Lake. They were standing waiting for the dogs to bay, when hearing a noise above, they flashed their dazzling lights into a tall sycamore tree. Immediately a great bird became confused and fluttered down from the branches. It alighted on the ground, then approached them half flying and half running with wings outspread. It seemed bewildered by the bright light. The men picked up sticks and beat the bird until it was stunned; then they incarcerated it in a sack. Another eagle fluttered down through the branches and landed in some bushes. It was immediately shot. Two

other large birds, probably eagles, were disturbed by the light and noise, but were successful in escaping into the upper darkness. (I have made inquiry, and from the good reputation enjoyed by these young men I have no reason to doubt their story. Certainly they had one live bird to add to the unfortunate list of sacrifices.)

March 8, 1934, I watched a pair of Bald Eagles hunting over the river at Clarksville, Missouri.

January 27, 1935, I saw two immature and one adult Bald Eagles seated on the branches of an uprooted cottonwood lying on a sand bar above Long Island. They were watching the antics of some American Mergansers swimming and fishing in the current below a break in the dike.

March 1, 1936, I saw three immature and one adult Bald Eagles fly over the woods at Willow Island seven miles north of Quincy. Although shot at several times by farmers, these birds survived the winter season, and were reported half a dozen different times. October 26, 1936, a Bald Eagle credited with killing a young pig, was shot at Camp Point. Two other Bald Eagles were killed in that neighborhood later in the winter.

November 12, 1936, C. L. Weems shot a Golden Eagle flying low over the sand bar near Willow Island. The same day an immature Bald Eagle was shot over a Bear Creek farm by Chas. E. Lane, assistant superintendent of schools.

November 15, 1936, L. H. Haener shot an immature Bald Eagle at Dillon's Island. The specimen was mounted.

January 18, 1937, LeRoy Knoepple, superintendent of schools, reported five Bald Eagles hunting daily over the waters south of the great dam at Hamilton.

January 1938, I received a letter from Warsaw telling of eagles eating fish on the large horizontal limbs of the sycamore trees, while crows on the ground below, were quarrelling over scraps dropped from above.

February 1938, residents living on the bluffs at Keokuk, watched with binoculars as the eagles robbed the gulls and crows which had retrieved dead or weakened fish from the waters below the dam. Once the fish were carried to the ice or bars, the eagles took possession of the booty.

There seemed to be a slight increase in numbers during 1938 and taxidermists reported two immature Bald Eagles brought in for mounting.

In 1939, there was an increase in the number of eagles gathered below Hamilton. Sixteen or eighteen birds were often seen hunting along the river, about one-third of them mature birds. As winter progressed, these birds worked farther south, and individual specimens were reported by hunters many times throughout the winter.

In 1940, only twelve birds were reported at Hamilton. However, other reports were about as usual as far south as Quincy. For the first year in a decade there were no eagles reported shot nor were any dead birds brought to the neighboring taxidermists.

Thus in the last twelve years we have had numerous live records, as well as ten or a dozen dead records of Bald Eagles; and at least three dead records of Golden Eagles. The latter specimens were all positively identified by me. It will be interesting to record the increase in numbers which will probably result from the government ban on shooting Bald Eagles. Sufficient food exists to support a much larger gathering of winter birds and a later note will be sent to 'The Auk' to record an increase or other variation in numbers.—T. E. MUSSELMAN, *Quincy, Illinois.*

Mexican Black Hawk in Tamaulipas: a correction.—According to recent observations *Hypomorphnus urubitinga* and *Buteogallus anthracinus* occur in about equal numbers along the Mexico City highway from Victoria to Mante, Tamaulipas, both forms being found at low elevations, especially near streams. In working up material collected by the 1938 Semple Expedition I misidentified two *Hypomorphnus urubitinga ridgwayi* specimens, however, calling them both *Buteogallus a. anthracinus*. These were an adult male (not a female, as indicated in the report), taken by Thomas D. Burleigh at San José de las Flores, near Victoria, February 23; and an immature female, taken by me along the Rio Sabinas, near Gomez Farias, March 2 (see Sutton and Burleigh, 'A List of Birds Observed on the 1938 Semple Expedition to Northeastern Mexico,' Louisiana State Univ. Mus. Zool. Occas. Pap., no. 3: 26, 1939). The mistake is regrettable. It probably would not have appeared in print had Mr. Burleigh and I not been in Mexico while the paper was being published. Mr. Burleigh is less responsible than I for the error, since he assumed that I was familiar with both species. I am grateful to Drs. Herbert Friedmann and John W. Aldrich for their assistance in identifying the specimens. Both are now in the collection of Cornell University.—George Miksch Sutton, *Ithaca, New York.*

Status of Upland Plover in Lancaster County, Pennsylvania.—Supplementing my report of August 3, 1939, in 'The Auk' of that year, my census of the Upland Plover, *Bartramia longicauda*, in Lancaster County, Pennsylvania, shows a notable increase. Following the well-defined tracts established in 1921, I saw more birds than I have seen since 1900, when plover shooting, during my lifetime, was at its height.

Tract B, since 1936, has become an airport, where no corn is planted, and where the manager, Jesse Jones, is so much interested in the plovers that he delayed cutting the grass until their eggs were hatched. Since 1710, when as an entirely forested area it was first settled, Lancaster County has never known so great a tract of continuously open, flat grassland as that of the Municipal Airport. It is ideal breeding ground in a country which must have been adopted by the Upland Plover. According to Alexander Wetmore, the increase since 1936 is due entirely to protection in the United States, for he knows of no change in the loose game laws of Argentina and Uruguay, where the plover spend the winter; and they are still being shot in many parts of their migration range, as in Barbados (Richard Pough). Obviously, with more than 6,000,000 licensed shotguns in the United States, the encouraging status of this picturesque bird depends upon keeping it off the list of North American game birds.

The census records are as follows:

	Tract A	*B*	*C*	*D*	*Total*
1921 (August 4)	12	3	3	3	21
1922 (August 3)	8	9	1	4	22
1923 (August 9)	23	36	1	18	78
1925 (August 8)	1	3	0	1	5
1936 (August 4)	5	22	4	11	42
1937 (August 4)	11	28	1	17	57
1939 (August 3)	14	75	0	5	94
1941 (August 4)	94	65	0	2	161

Tract A includes three square miles in Penn-Warwick townships; B, two square miles in Warwick-Manheim townships; C, one square mile in Warwick township;

and D, two square miles in Elizabeth-Clay townships.—HERBERT H. BECK, *assisted by* BARTON SHARP, ELBERT NIXDORF, and JAMES COHO, *Franklin and Marshall College, Lancaster, Pennsylvania.*

Western Sandpiper in western Missouri and eastern Kansas.—An unusual occurrence of the Western Sandpiper (*Ereunetes maurii*) was noted in late summer of 1940 in western Missouri and eastern Kansas. Bent ('Life Histories of North American Shore Birds, Part I': 262, 1927) says " . . . it is rare or casual inland . . . migration records for the great interior are almost entirely lacking and how it reaches the Atlantic coast, where it is so abundant in fall and winter, is a mystery." Widmann ('A Preliminary Catalog of the Birds of Missouri,' Trans. Acad. Sci. St. Louis, 17: 70, 1907) states that this species "has been taken a few times in spring on sandbars in the Mississippi River by Mr. Chas. K. Worthen of Warsaw, Ill." Harris ('Birds of the Kansas City Region,' Trans. Acad. Sci. St. Louis, 23: 251–252, 1919) mentions that the Western Sandpiper "has been identified two or three times in spring flocks of other shorebirds, but no specimens have been taken." This is the latest information that the writer has on the occurrence of this species in Missouri. Bunker ('The Birds of Kansas,' Kans. Univ. Sci. Bull., 7: 144, 1913) says of this species, "new to the list, added by G. D. Hanna, May 26, 1906, near Lawrence. In the spring of 1906 six more specimens were collected, and one in 1910." Dumont ('A Revised List of the Birds of Iowa,' Univ. Iowa Studies Nat. Hist., 15: no. 5, 72, 1933) states, "the only Iowa record is of two males and a female, collected by Paul Bartsch at Burlington, Des Moines County, October 15, 1895." It is interesting that no fall records are available in Missouri.

Because of the failure of the June rise of the Missouri River, which usually overflows into the adjoining lakes, the water level of the lakes in the Missouri River valley in the region of Kansas City became low in the summer of 1940. The receding water left extensive mudflats at Sunshine Lake, Ray County, Missouri, and Sugar Lake (until August 18), Buchanan County, Missouri, both of which attracted large numbers of shorebirds in late July and August.

On July 14, 1940, Mr. Harold Hedges and the writer first identified at Sunshine Lake ten Western Sandpipers among a total of eighteen sandpipers, which consisted of three Spotted Sandpipers (*Actitis macularia*), two Lesser Yellow-legs (*Totanus flavipes*), and three smaller sandpipers which flew before they could be identified. The 'Westerns' were studied for over 30 minutes in good light with 8-power binoculars. The bills of the 'Westerns' were noticeably longer than the heads, thick at the base, and slightly down-curved at the end. The upper parts and heads were quite rusty; the breasts were dusky; legs were black.

The first of this species was seen on July 4, 1940, by the writer at Bean Lake, Platte County, Missouri. Although this bird was unidentified at the time, notes were taken of certain pronounced characteristics: bill was longer than the head and was slightly down-curved at the end; size about the same as a 'Semipalmated'; breast was dusky.

Some friends notified me of some shorebirds seen at a small pond near Knobtown, Jackson County, Missouri, on July 14, 1940. I visited this place on July 15 and found three Western Sandpipers.

On July 21, I visited Sugar Lake. Six Western Sandpipers and four Semipalmated Sandpipers (*Ereunetes pusillus*) were compared. The rusty on the head and sides of neck was noted on five 'Westerns'; the sixth bird was lighter on the breast and light gray on sides of head and neck. On this same day, Mr. Hedges

observed two Western Sandpipers among other shorebirds at Shawnee Lake, Shawnee County, Kansas. He informs me that one of these two was almost in full breeding plumage as it was quite rusty on head, neck, and scapulars.

Western Sandpipers were again seen on July 28, 1940, by Mr. Hedges and the writer at Sunshine Lake. Three and one-half hours were spent searching and observing the 350–400 shorebirds. Five 'Westerns' were identified with certainty among about thirty Least Sandpipers (*Pisobia minutilla*) and twenty Semipalmated Sandpipers. Due to the difficulty in identifying the Western Sandpipers, more might have been present. The 'Westerns' were evidently in the process of molting as they were much grayer, especially about the head and neck, than those seen in the previous three weeks.

The species was most numerous on August 4, 1940, when at least fifteen were seen at Sugar Lake by Mr. Hedges and the writer. Also present were about 150 Least Sandpipers and 200 Semipalmated Sandpipers. At Sugar Lake on August 11, 1940, Mr. J. W. Cunningham, Mr. Hedges, and the writer saw six 'Westerns.'

Of seven 'Westerns' observed at Sunshine Lake on August 18, 1940, by Mr. Cunningham, Mr. Hedges, and the writer, one which proved to be a female, was collected by Mr. Cunningham, for the University of Missouri. The measurements of this specimen are: wing, 99 mm.; tarsus, 23; bill (culmen), 28; tail, 39. On this date the 'Westerns' were compared with three Baird's Sandpipers (*Pisobia bairdi*), one of which was collected by Mr. Cunningham. The Baird's Sandpiper is a slightly larger bird than the Western, is browner above with white-edged feathers, and has a brownish breast; the bill is not as long.

Five Western Sandpipers were seen at Sunshine Lake on August 25 by Mr. Cunningham, Mr. Hedges, and the writer. Comparisons were again made in the field with Baird's Sandpipers. Mr. Cunningham and I visited the same place on September 1, 1940, and saw three 'Westerns.' On subsequent trips we failed to find this species.

Having had considerable experience with this species in these two months, the writer was able to distinguish it without the aid of glasses. On all occasions the Western Sandpipers' preference for the deeper water was noticed, while the Semipalmateds preferred the water near shore, and the Least Sandpipers stayed more on the shore. The bill is carried downward by the 'Western,' which is a helpful aid in identification; even in flight, the bird carries its long bill tilted downward. On all occasions the Western Sandpipers were compared with other small sandpipers. Future studies may reveal to us that this species regularly migrates through this region.—Earl T. Newton, *5500 College Avenue, Kansas City, Missouri.*

Types of shorebird flight.—During the spring and fall of 1940 and the spring of 1941 I had frequent chances to watch shorebirds from the air over San Francisco Bay. Sometimes, under the privileges of a practice area, it was even possible to follow up individual flocks at altitudes elsewhere illegally low. Most flocks, merely shifting about their feeding grounds or flushing ahead of a low-flying plane, seemed capable of very little speed,—even small commercial ships passed over or overtook them at two to one, and I began to doubt whether Least or Western or Red-backed Sandpipers (*Pisobia minutilla, Ereunetes maurii, Pelidna alpina sakhalina*) or godwit or curlew (*Limosa fedoa* and *Phaeopus hudsonicus* or *Numenius americanus*) could exceed at most 45 to 55 miles per hour, air speed, which roughly corresponds to Meinertzhagen's figures (Ibis, (11) 3: 228, 1921), until a single startling experience removed all doubt. Previously I had seen few flocks at alti-

tudes of over 300 feet, none over 600. On April 5, 1941, just before dusk, I was heading west up the outer boundary of the Oakland Airport at 1500 feet altitude and an air speed of 90, when two small, tight flocks, of perhaps a hundred birds each, characteristic mixtures of Red-backed and smaller sandpipers, overhauled me to starboard at an angle of about 30° to my course, crossed my nose, without hesitation or deviation, at a distance of not over 25 yards, and drew away to seaward. Unfortunately I was tied into the control traffic of a great airport, and could not follow. The two flocks were in close echelon, the individual positions fixed, the wing-beats rhythmic and powerful, in extreme contrast to the desultory, easily deflected flight of the lower flocks. The question of angle makes estimation of speed difficult, but familiar contact with other ships of known speed convinces me that the flocks were not moving under 110 m.p.h. air speed, and probably a good deal over. Without attaching too much weight to a single episode, however precise and unmistakable, I believe I had had the great luck to stumble on a near view of true migratory flight at a relatively high altitude, and suspect that, even if we do not subscribe to the romantic notions of a Gätke, it is not impossible that, contrary to the concensus of published opinion, not a slow, but rather a very fast mode may be used under such circumstances. Such a mode might even be a restricted or seasonal phenomenon, latent or impossible in the interim.—T. T. McCabe, *2620 Parker Street, Berkeley, California.*

Black-billed Cuckoo in Colorado.—The thirteenth and fourteenth records of the Black-billed Cuckoo (*Coccyzus erythrophthalmus*) in Colorado, have come from within the Denver city limits this past summer. On June 5, 1941, a dead bird which had been clipped by a lawn mower, was found near Washington Park, and was taken by Mr. Dexter Landau, to the Colorado Museum of Natural History, where it was identified, and numbered 22620. The sex could not be determined. On August 22, 1941, I flushed a bird from ground covered with tumbleweeds, at the edge of the prairie, near a brick-yard at East 33rd Avenue and Dahlia Street. The size and shape and color and flight were those of a cuckoo (I have seen several in Connecticut), and no tail spots or rusty wing-feathers showed. After a low flight of about fifty yards the cuckoo alit in the weeds. I flushed it again and it flew back near the place where it had first been seen. The next time it was flushed it flew about twenty yards and perched on the edge of a brush pile, where I got a quick look at it through 8-power glasses. An Arkansas Kingbird dived at the cuckoo and it dodged into the brush. I went a quarter of the way around the brush so as to put the sun at my back, and slowly walked to the very edge of the pile without glimpsing the bird. Then I shook one of the limbs, and the cuckoo hopped out and perched in full view, for what seemed like a whole minute, on a twig not more than six or seven feet away. The entire bill was shiny black, and the spot which showed on the left side of the tail was about a quarter of an inch long. The bird flew away and circled back to the foot of a fencepost some twenty-five feet from the brush; then hopped up on a rail of the fence. It soon flew away out of sight beyond some buildings. That evening and the next morning I spent two hours unsuccessfully looking for a nest, but did not see the cuckoo again.—Thompson G. Marsh, *University of Denver Law School, Denver, Colorado.*

Second Record for Western Burrowing Owl in Wisconsin.—On October 8, 1941, while engaged in field work for the Milwaukee Public Museum I collected a Western Burrowing Owl, *Speotyto cunicularia hypugaea,* for that institution.

The bird was observed along the Lake Michigan shore at a point east of Cedar Grove in Sheboygan County, Wisconsin. It was flushed twice from a shallow dried-up slough, which was sparsely overgrown with willow and fringed with cat-tails, and finally from among the higher dunes. It was reluctant to leave the immediate locality. Having observed it only in flight, but feeling quite sure that it was a Burrowing Owl, I collected the bird and it proved to be of the Western variety.

Mr. William Elder of the University of Wisconsin Zoology Department collected a specimen of the Western Burrowing Owl at Faville Grove, Lake Mills, Jefferson County, on April 9, 1939 (see Passenger Pigeon, 1: no. 4, 1939). To the best of my knowledge our specimen would therefore constitute the second known record of the taking of this species in Wisconsin.—WALTER C. PELZER, *Milwaukee Public Museum, Milwaukee, Wisconsin.*

Catbird wintering in Maryland.—A Catbird (*Dumetella carolinensis*) first seen on November 3, 1940, remained in the northwestern part of Baltimore city through February 23, 1941, disappearing between that date and the 26th. This appears to be the most extended winter stay on record for a Catbird in this region. Others of the species were last seen in the same locality in 1940 on October 14, and first seen in 1941 on April 30, both averages dates.

After a threat of severe cold, including a snow, in the second half of October, the winter of 1940–41 was mild and open. The mean temperature for the four-month period of the Catbird's stay was 40° F., 1.8° above normal; the minimum reached was 18°, in December and January. A snow of 5.2 inches on January 26–27 was the only one that lay as long as one day; snow for the four months totalled 10.5 inches, 7.0 inches less than normal. Both colder weather and heavier snow came toward mid-March. From December 1 on, the wintering bird was visited every few days and watched, as opportunity offered, for from several minutes to an hour and a quarter at a stretch; it was actually under observation for a total of ten and a half hours.

Its habitat, in some undeveloped land, was a little hollow densely grown with blackberry bushes and a variety of saplings. Much of that growth, in turn, was heavily overrun by vines, chiefly Japanese honeysuckle. The flat bottom of the hollow was made marshy by a tiny stream.

At first the bird confined itself closely to the marshiest area that contained both dense ground cover and an abundance of wild fruits, but later it extended its movements to include more and more of the sides of the hollow. Thus on December 4, it was roving only about 25 yards north and south and 25 yards east and west; on January 1, these distances were 85 and 35 yards, on January 29, they were 90 and 65, and on February 19, they were 185 and 65. The bird did not exhaust the fruits of one area before adding another to its range; for example, honeysuckle berries were still being eaten on February 23 from a large vine first fed from on January 1. Another seasonal change in habits was an increase in hours of activity. Throughout most of the winter the bird could be found only in the morning. Searches on six afternoons between November 4 and December 22 were vain. No other was made in the afternoon, then, until February 9; on that afternoon it was found, and also on all of several later ones when it was looked for. It was feeding on each of these occasions.

Feeding was seen on twenty-three days, and five foods were observed. The abundant berries of the Japanese honeysuckle (*Lonicera japonica*) were eaten on

twenty-one days from December 1 through February 23, and in such quantities as thirty in twenty-two minutes (December 29), and forty-five—besides some other food—in seventy-two minutes (January 8); forty-five of the berries were found to weigh 4.87 grams. Haws of the cockspur thorn (*Crataegus Crus-galli*) were eaten on six days, chiefly between February 2 and February 20, when honeysuckle berries were becoming scarce. Frost grapes (*Vitis cordifolia*) were eaten on two days through January 8, after which they were unavailable. Seeds of poison ivy (*Rhus toxicodendron*) were eaten on December 22, and seeds of dwarf sumac (*Rhus copallina*) on February 2. The bird also frequently fed on the ground.

The Catbird associated with White-throated Sparrows (*Zonotrichia albicollis*), a small flock of which wintered in the same hollow. This association was first consciously noted on January 19; from that date through February 16, the Catbird was initially found with the White-throats on three-fourths of all the visits paid to it. And although the sparrows also fed heavily on honeysuckle berries—the two species were each other's chief competitors for these—the association seemed to be sought by the Catbird, rather than based merely on the identity of food. The berries were available all over the hollow, and when the sparrows went well up the hillsides for them the Catbird usually stayed apart; but when the White-throats were feeding in lower areas the Catbird often fed among them on the vines, or fed from a vine ten or fifteen feet above while they foraged over the ground below, and a number of times it was seen to follow them when they moved from place to place. After February 16, when the Catbird was roving most widely, however, this association was only occasional.

Only two notes were heard: the mewing one, and the explosive, ratchety one.

Although the bird's extensions of area and hours of activity suggest strongly, when set down on paper, that its departure was finally caused by an exhaustion of food supplies, this was not so clear from actual observation. On February 23, honeysuckle berries were extremely scarce, but they were found by the White-throats on through March 12; a fair number of haws remained on the one thorn tree; poison-ivy seeds were still available; and the ground was free of snow. There was no marked change in the weather to account for the departure.

Mr. Frederick C. Lincoln has kindly checked the U. S. Fish and Wildlife Service files for comparable stays in this vicinity, and writes that for Washington, D. C., "there is a late date of departure of December 6 in 1917, while there are at least four winter records as follows: one was noted December 25 to 31, 1883, and one was killed on January 13, 1889. One was noted at the Zoological Park from December 13, 1924, to January 6, 1925. One appeared at a feeding table near the Zoo about February 2, 1925. . . . Your date of February 23 is the latest that has come to my attention for this general region."—HERVEY BRACKBILL, *3201 Carlisle Avenue, Baltimore, Maryland.*

Wood Thrush nesting in the coniferous bogs of Canadian Zone.—The Wood Thrush (*Hylocichla mustelina*) was first found nesting in the vicinity of the University of Michigan Biological Station, Cheboygan County, Michigan, by Dr. Frank N. Blanchard on July 4, 1930, along Carp Creek near Burt Lake. On July 2, 1941, Dr. O. S. Pettingill, Jr., found a nest at North Fishtail Bay on Douglas Lake. Both nests were built in balsam fir (*Abies balsamea*) in low cedar-spruce-fir bogs. The first nest was twelve feet above the ground and contained three well-developed young. The second was eight feet from the ground, saddled on a horizontal branch two feet from the main trunk. It contained one young

bird which left the nest when approached. Both nests were lined with mud. The second nest was collected after it was no longer in use.

Since 1911, the Wood Thrush has been reported sporadically in the vicinity of the Biological Station (F. N. Blanchard and Theodora Nelson, MS.). In the majority of instances the birds were found in bogs. In 1941, while making a special survey of the bird life in the coniferous bogs of Cheboygan County, I identified four singing male Wood Thrushes in two widely separated bogs. Two of these birds were seen clearly. The bog woods in which the Wood Thrushes were found are frequented by such birds as the Myrtle Warbler, Black-throated Green Warbler, Winter Wren, and Red-breasted Nuthatch,—birds which clearly designate these areas as typical of the Canadian Zone. Eaton (Birds of New York, 1: 41, 1910) has indicated that in New York State the Wood Thrush is a nesting bird of the Canadian Zone in some parts of the State, and Roberts (Birds of Minnesota, 2: 122, 1932) has noted the northward spread of this bird, in recent years, into the Canadian Zone in Minnesota. These conclusions are supported by observations in Cheboygan County, where the Wood Thrush has shown a decided preference for the Canadian with no tendency to inhabit the Alleghenian Zone which is present in much of the county.—Oscar M. Root, *Brooks School, North Andover, Massachusetts, and University of Michigan Biological Station, Cheboygan, Mich.*

Golden Warbler nesting in Lower Florida Keys.—While exploring one of the Bay Keys in the Great White Heron National Wildlife Refuge off Key West, Florida, on June 15, 1941, with Roger Tory Peterson of the National Audubon Society, a male warbler, in full song, was located. In coloration and song it was similar to the well-known Eastern Yellow Warbler, *Dendroica aestiva aestiva*, but the fact that it was several hundred miles south of the known breeding range of that bird and also certain differences in notes, led us to believe that possibly some West Indian form was nesting in these keys. On June 26, the writer located it again on the same key, and on the 28th the male, female and nest were found. The last was in the top part of a red-mangrove tree (*Rhizophora mangle*) and was composed of seaweed and feathers; it contained one egg, white with brownish markings chiefly about the larger end. On July 10, the egg was found broken, apparently jabbed, possibly by a Red-wing nesting nearby. On July 16, the male bird was collected, and on the 30th the female. Identification of these birds was made by Dr. John W. Aldrich, Biologist of the Section of Biological Surveys, Division of Wildlife Research, of the U. S. Fish and Wildlife Service, Washington, D. C., who states that they are specimens of the Golden Warbler, *Dendroica petechia gundlachi*, never before recorded in the United States, but known to breed in Cuba and the Isle of Pines.—Earle R. Greene, *U. S. Fish and Wildlife Service, Key West, Florida.*

Louisiana Water-Thrush breeding in New Hampshire.—The following record concerns what is to my knowledge the first positive breeding record of the Louisiana Water-Thrush (*Seiurus motacilla*) in New Hampshire. The only other record I know of is a hypothetical sight record made by Mr. G. E. Thayer at Dublin, in August 1901.

I am quite familiar with the Louisiana Water-Thrush from my experience with the bird in Chester Co., Pennsylvania, where I have lived for the past two years. I had never seen the bird in New England until April 22, 1941, when Mr. Samuel Eliot showed me two pairs on the Mount Tom reservation at North Hampton, Massachusetts.

On May 6, 1941, as I was walking through a heavily wooded hillside on the Rathbun place in Harrisville, Cheshire Co., New Hampshire, I heard the loud bubbling song of a Louisiana Water-Thrush emanating from a bog in the middle of the woods about halfway down this hillside. I crept quietly toward the bog and soon saw the bird perched about fifteen feet up in a slender maple sapling over a pool of stagnant water. There was no mistaking its identity. I studied it for fifteen minutes in good light at a distance of thirty feet with eight-power glasses and there was not a trace of yellow on its under parts which were dull white with blackish streaks down the flanks and on the stomach. A second bird, also a Louisiana Water-Thrush, was seen walking over the muck, turning over wet, soggy leaves, almost under the tree in which the first bird was singing.

On May 20, I went again to the bog on the chance that the birds might have stayed to nest. Quoting from my notes: "—As I approached the bog I heard the male singing and made up my mind that the pair are staying here to nest. This bog is about an acre and a half in area and is filled with uprooted trees blown over in the 1938 hurricane. A sluggish stream flows through this area and water has accumulated in the holes where the roots of the trees had been pulled up. I searched under the roots of these upturned trees for half an hour and finally, as I approached one large mass of upturned roots, I saw one of the water-thrushes walking quietly along at the base of the roots and disappear under a cave formed by an overhanging mass of roots. I crept on my hands and knees under this cave and the bird appeared within six feet of me, chipping excitedly and acting much concerned at my interest in this particular uprooted tree. A ten-minute search failed to reveal the nest."

Then on May 27 I found the nest with four fresh eggs in the roots of this same cave. Again quoting from my notes: "This morning I again looked for the Louisiana Water-Thrush's nest. I looked first under the roots of the upturned spruce tree where the bird had acted so concerned on May 20. I flicked a stick around under the cave but no bird flushed. Then, just to make sure, I got down on my hands and knees and looked under the overhanging roots and there, within four feet of my face, was a Louisiana Water-Thrush sitting on its nest. The nest was placed back about three inches in a hole in the roots where a rock had been and was sunk into the dirt among the roots. I touched the bird before it flew out, disclosing four eggs, white with a wreath of light-brown spots and blotches around the larger end."

There was another pair of Louisiana Water-Thrushes that bred in Dublin, New Hampshire, this spring (1941). I first saw the birds on May 15 in a bog in the woods between Dark Pond and the Dublin golf course. I heard the male singing here all during May and early June and, although I did not look for the nest, I feel sure that there was one.

On July 6, 1941, Mrs. Grenville Clark reported seeing a Louisiana Water-Thrush within a few feet of her in her garden near a lily pond. Her place is about one mile from the bog near the Dublin golf course where I saw the water-thrushes and her bird may well be one of that pair or one of their offspring. Dublin and Harrisville are adjoining towns on the north side of Mt. Monadnock.—Jackson Miles Abbott, *Box 138, Dublin, New Hampshire.*

Breeding status of Connecticut and Mourning Warblers in Wisconsin.—On July 7, 1941, while tramping through an extensive spruce and sphagnum bog in Douglas County in the town of Wescott, Wisconsin, we flushed from underfoot a

young bird, which flew for a few feet in the uncertain manner of a fledgling. From a point of concealment close by, after a short wait, we observed an adult Connecticut Warbler (*Oporornis agilis*) feeding the young we had under observation. By watching the old bird we later located three more young. For the record we collected the group. In the same locality on the same date, but on higher ground, we saw and heard several Mourning Warblers (*Oporornis philadelphia*).

The foregoing will be interesting in the light of the following. In referring to *Oporornis philadelphia*, Kumlien and Hollister in their 'Birds of Wisconsin,' (118, 1903) state: "Notwithstanding the general breeding range of the two species, as usually given in works of authority, we are of the opinion that this species never breeds in Wisconsin, although the other does, quite the opposite of the case, as usually given. We think any breeding record of this species for Wisconsin that may ever have been published, must surely refer to *agilis*."

In referring to *Oporornis philadelphia*, A. W. Schorger in his 'Birds of Dane County, Wisconsin' (33, 1931) states: "Contrary to the statement of Kumlien and Hollister, the breeding bird in northern Wisconsin is *O. philadelphia* and not *O. agilis*." In his reference to *O. agilis* on p. 32, he states that "all breeding records for the state are questionable."

Mr. Schorger published the first Wisconsin breeding record for *O. philadelphia* in 'The Summer Birds of Lake Owen' (Auk, 42: 69, 1925) and there have been several unquestionable nesting records published since. It can therefore be stated that both species are known to breed in Wisconsin.—O. J. Gromme, *Milwaukee Public Museum, Milwaukee, Wisconsin.*

Hooded Warbler in Wisconsin.—Because of the rarity of the Hooded Warbler (*Wilsonia citrina*) in Wisconsin, the appearance of one in Milwaukee is of ornithological interest. On April 27, while on a field trip sponsored by the Milwaukee Public Museum, an adult male was observed at Lake Park in a well-wooded ravine that has a small creek flowing through it. When first observed the bird was taking a bath. It was not concerned over our intrusion, and after completing its ablution, it flew to a low overhanging branch and proceeded to preen its feathers. It was quite fearless and allowed a group of five to approach close enough to observe its characteristic markings even without the aid of a glass. After completing its toilet, it flew to the ground and started hunting for insects. We watched the bird for perhaps twenty minutes, when another group arrived, all of whom were able to observe its markings.

None of us had ever seen this species before, but the markings were so characteristic, that each and every one identified the bird without difficulty. Besides its characteristic markings, the broad yellow mask extending over the forehead, and behind and below the eyes, set off by a black framework which formed the cap and bib, the bird continually spread its tail, showing its outer white tail-feathers. One member of the party called Mr. Phillips and Mr. Jones of Waukesha, who drove into Milwaukee and managed to take colored motion-pictures of the bird. On April 29 and 30 the bird was again seen by various parties.

The records for this species in Wisconsin are very few. Hoy in his 'Notes on the Ornithology of Wisconsin' records them from Waukesha County. Kumlien and Hollister in 'The Birds of Wisconsin' record them from Jefferson, Dane, Rock, and Milwaukee Counties.—Walter J. Mueller, *3043 North Prospect Avenue, Milwaukee, Wisconsin.*

Notes on Siamese races of *Pomatorhinus schisticeps*.—Messrs. Delacour and Greenway have recently published (L'Oiseau et la Revue Française d'Ornithologie, n. s., 10: 63–66 and map, 1940) a review of the distribution in French Indo-China of the subspecies of *Pomatorhinus schisticeps*, the Yellow-billed Scimitar-babbler. In default of material from that area I am unable to pass judgment on the views there set forth, but believe that it may be of interest to add to their discussion certain opinions on the races occurring in Siam, developed after comparison of the excellent series in the U. S. National Museum with types or topotypes of all the pertinent forms at the British Museum in 1939. Inasmuch as, since 1928, the birds of Doi Suthep alone have been reported by various authors as *olivaceus*, *ripponi*, and *nuchalis*, it is evident that examination of types was in order. *Pomatorhinus s. klossi*, a highly saturate race restricted to the humid lowlands of southeastern Siam, and *humilis*, known in Thailand only from Nan province on the borders of Middle Laos, need merely be mentioned, since neither comes into contact, nor shows intergradation, with any more western form.

The races found in the hilly districts of western Siam are decidedly unstable but, with good series, may be separated by application of the 75% rule. At Kanburi, southwestern Thailand, occur individuals which cannot be distinguished from types or topotypes of *olivaceus*, *siamensis*, and *fastidiosus*! The last is probably recognizable in having an increased tendency to develop a blackish edging above the white supercilium. *P. s. siamensis* (1917) is a pure synonym of *olivaceus* (1847), which, within our borders, ranges from the Isthmus of Kra north as far as Raheng, beyond which it intergrades with *ripponi*.

P. s. ripponi (with type specimens from Pyaunggaung, Northern Shan States) is not certainly separable from *olivaceus* by color but may be distinguished by its lesser dimensions, especially its lighter, shorter bill. From *nuchalis* it may be known by its having the sides of the body olivaceous or pale rufous, whereas *nuchalis* has the rich chestnut of the sides of the neck continued unchanged to the lower flanks. *P. s. ripponi* reaches its eastern limit on the hills of the Khun Tan chain, whence eight out of nine birds agree perfectly with specimens from the Shan States. Westward, on the mountains of the Thanon Thong Chai range and in Me Hong Son province, are birds which are somewhat intermediate between *ripponi* and *nuchalis* in having the sides of the body more richly colored, but which are still nearer *ripponi*. Not until the Salwin is crossed do we find examples which are definitely more *nuchalis* than *ripponi*.

The type locality of *nuchalis* is not Thayetmyo, as alleged by authors, but "Karen hills," *fide* Wardlaw Ramsay, collector of the original series (Ornithological Works of Arthur, Ninth Marquis of Tweeddale, 1881, p. 669). To judge by the ample material in London, the name may properly be used *only* for the deeply colored population of the Sittang-Salwin watershed, which, northward and eastward, fades into *ripponi*, southward into *olivaceus*. An occasional Siamese specimen of *ripponi* has many of the breast-feathers with small rufous tips but this must be considered an individual variation without racial significance.—H. G. Deignan, *U. S. National Museum, Washington, D. C.*

New name for *Stachyris leucotis goodsoni*.—I propose the new name *Stachyris leucotis obscurata*, for *Stachyris l. goodsoni* Hartert (Bull. British Ornith. Club, 36: 7, 1915—Borneo), since it is preoccupied by the earlier *Stachyridopsis* (= *Stachyris*) *ruficeps goodsoni* Rothschild (Bull. British Ornith. Club, 14: 8, 1903—Hainan). *Stachyris leucotis obscurata* differs from typical *leucotis* (Malay Peninsula) by the

darker coloration of the head and the deeper rust-brown color of the back. The species has recently been discovered on Sumatra (*sumatrensis* Chasen, Treubia, 17: 184, 1939).—Ernst Mayr, *American Museum of Natural History, New York City.*

White-winged Crossbills and Sitka Crossbills summering in the West Virginia spruce belt.—The summer of 1941 was a notable one for West Virginia bird students, due to the presence of large numbers of crossbills in the red-spruce (*Picea rubra*) forests which clothe many of the higher mountain ranges. The writers, accompanied by I. B. Boggs and Gene Frum, had opportunities to observe the birds during the second week of June, and at subsequent times during the summer.

On June 9, 1941, a trip was made to Dolly Sods fire-tower, a high point on the Allegheny backbone, where Tucker, Grant, and Randolph Counties, West Virginia, meet, with Pendleton County almost contiguous to the three others. Here a flock of White-winged Crossbills, numbering well over a hundred was seen. The birds were feeding on the flowers of the spruce trees, and were decidedly restless, never allowing a very close approach. They circled overhead a number of times during our stay at this point, and we were unable to determine that any but White-winged birds (*Loxia leucoptera*), were in this flock. Unfortunately, efforts to collect specimens were unsuccessful.

Later in the same day we visited Gaudineer Knob in the Cheat Range, where Randolph and Pocahontas Counties join. At this point Red Crossbills have been under observation for the last three years (see Auk, 57: 576–577, 1940). Almost immediately we saw a flock of 65 White-winged Crossbills which again kept out of our way. After they had fed for a time on the blossoms of the spruce trees we followed them with our glasses as they flew to another point a mile or so distant. On June 10, on the same mountain, we saw a smaller mixed flock of White-winged and Red Crossbills.

This constitutes the first known summer record for White-winged Crossbills in West Virginia, and the first State record of any kind for these birds since the winter of 1921. Although no specimen was secured, we saw the birds under circumstances which seem to justify the publication of this sight record. On June 9, 10, and 11, and again on various later dates in June and July, Red Crossbills were seen by various observers in the Gaudineer region.

From the mixed flock of White-winged and Red Crossbills (the birds were feeding at the top of a very high spruce tree) seen on June 10, a single bird was collected. Unfortunately it lodged near the top of the tree, and had to be shot down. The bird, an adult male Red Crossbill, was badly shot to pieces, but, luckily, the bill was uninjured, and it was possible to preserve the head and wings. From a small flock of Red Crossbills seen on the Pocahontas County side of Gaudineer Knob on June 11, two individuals, an adult male and an adult female, were taken. For critical determination these birds were submitted to Mr. Ludlow Griscom, who has kindly given us permission to quote from his findings. Under date of July 18, 1941, he writes (in part):

"1. Adult female. Typical *minor* without a shade of doubt.

"2. Adult male, coloration more scarlet, wing 82.8, culmen 15 × 8.8, characteristic *minor* from the coast of southern British Columbia. The small and, above all, slender bill precludes its being the Appalachian Mountain subspecies.

"3. The adult male fragment, color doubtful, wing 80.5, culmen 15 × 9.2. This bird exactly matches intermediates between *minor* and *bendirei* from southern British Columbia discussed in my monograph on page 122, paragraph 3, of the systematic discussion."

Through these specimens therefore West Virginia is added to the States reached by the 1940–41 Sitka Crossbill migration. The last (and only) previous record for this bird in the State was made in 1889 (see Griscom: 'A Monographic Study of the Red Crossbill,' Proc. Boston Soc. Nat. Hist., 41: 124, 1937). It seems highly interesting that both Sitka Crossbills and White-winged Crossbills lingered through the summer so far south as West Virginia.

We are convinced that the best time to find crossbills in the West Virginia mountains is during the first three weeks in June when the young spruces are often bearing good flower crops. The individual carpels of these flowers are loaded with waxy grains, and have a decided sweetish taste. Birds which had obviously been feeding extensively on these blossoms were very fat, the fatty tissues hard and firm.—MAURICE BROOKS, *West Virginia University, Morgantown, West Virginia,* AND WILLIAM A. LUNK, *Fairmont, West Virginia.*

January 1940 in southern Mississippi.—January 18, 1940, was a normal winter day in every respect on the Gulf coast of Mississippi. The temperature was well above freezing, the sun shone, and a mild wind blew from the northwest. As evening approached, however, this wind increased in velocity, the temperature rapidly dropped, and by the following morning southern Mississippi, in common with all the Southeast, was experiencing the first day of a cold wave that was unprecedented in the history of the Weather Bureau. The temperature registered 14 degrees Fahrenheit the morning of January 19, and during the succeeding thirteen days there was little evidence of thawing even during the middle of the day, and at night the temperature dropped 21 degrees or lower. Lower temperatures have been recorded in past years, but only for very brief intervals, and never for such long duration or intensity. At Hattiesburg, 52 miles north of Gulfport, snow reached a depth of three inches during this abnormal cold weather, and at Saucier, 25 miles north of the coast, sleet on January 23, and the two following days, covered everything with a coating of ice. South of this point, however, the ground remained bare; not even a trace of snow was reported.

The first apparent effect of the heavy snowfall and abnormally low temperatures farther north on the bird life of the coast region was the sudden abundance of Robins (*Turdus migratorius*) and Pipits (*Anthus spinoletta rubescens*). Robins winter about Gulfport in small scattered flocks, and are a recognized part of the winter bird life, but never before have they been so numerous. Flocks numbering several hundred individuals were literally everywhere during this interval, and for at least a month there was little decrease in their numbers. Pipits are likewise not uncommon here during the winter, but the third day of the cold wave small flocks were noted feeding on the roads and in open fields and pastures, and for several weeks these birds were a conspicuous part of the winter bird life.

January 23 witnessed what might be considered the first major ornithological event in this unusual winter. On that day a flock of fully 300 Bronzed Grackles (*Quiscalus quiscula aeneus*) was observed feeding in a stretch of open pine woods. During the preceding five years no grackles of any of the present recognized races had been recorded during the winter months in southern Mississippi. Breeding

birds invariably disappeared early in October, and it was February before they were seen again. Apparently, however, for this one time at least conditions farther north were such as to force even such a hardy bird as the Bronzed Grackle far south of its usual winter range. Flocks seen on subsequent days were much smaller, but through February 21, grackles were noted at intervals about farm yards and in the open fields. Without exception, specimens taken proved typical *aeneus*.

The Fox Sparrow (*Passerella iliaca iliaca*), heretofore unrecorded on the coast over this same five-year interval, was another species that almost at once showed its inability, or lack of desire perhaps, to face the deep snows and subzero temperatures throughout its normal winter range. On January 24, four of these birds were seen for the first time, feeding about a thicket at the side of a road, and within a day or so they were actually plentiful. The numerous flocks seen daily usually comprised from four to ten or twelve individuals, although by the last of the month it was not uncommon to find as many as thirty of these birds feeding together in swampy woods bordering the streams. The suddenness with which they appeared on the coast is indicated by the fact that on January 25 they were not only fairly common on the mainland but were equally numerous on Deer Island, lying a mile offshore from Biloxi. Throughout the greater part of February no perceptible decrease in their numbers was noted, and it was not until February 25 that the last bird was seen, a lone individual feeding with a flock of White-throated Sparrows. As late as February 22, however, small scattered flocks were seen, so it would appear that the Fox Sparrows departed as abruptly as they had arrived.

It was anticipated that the Slate-colored Junco (*Junco hyemalis hyemalis*), rather scarce but of regular occurrence here during the winter, would be really plentiful for the first time, but oddly enough this did not prove to be the case. Practically no increase in its numbers was observed, and the only occurrence at all out of the ordinary so far as this species is concerned was the presence, on February 4, of three birds, all females, on Cat Island, one of the barrier islands nine miles offshore from Gulfport. There is no previous record of the occurrence of the junco off the mainland.

Although apparently not the case in other parts of the Southeast, bird mortality here on the coast during this period of exceptionally severe winter weather was not very great, and was limited to a few species. This was possibly due to the fact that the snow did not reach this far south, and that the normal food supply was relatively unaffected. Tree Swallows (*Iridoprocne bicolor*) had an abundance of myrtle berries to rely upon, and during this interval concentrated in enormous numbers where the thickets of myrtle bushes fringed the salt marsh. Two that were collected then from a flock numbering fully a thousand individuals were found to be in good condition physically, and had sufficient fat on their bodies to have enabled them to survive for an indefinite period. The species that did suffer, however, were the Blue-headed Vireo (*Vireo solitarius*), the Orange-crowned Warbler (*Vermivora celata celata*) and the Ruby-crowned Kinglet (*Corthylio calendula calendula*), birds depending on insects for the bulk of their food. Reasonably plentiful until the cold wave appeared, they disappeared almost at once, and never did regain their normal numbers during the remainder of the winter. In late February and early March an occasional Blue-headed Vireo and Orange-crowned Warbler were seen, but not a single Ruby-crowned Kinglet.

Despite the fact that no dead birds were found, it appeared as if the Kinglets wintering in this region were practically exterminated by the subfreezing temperatures that persisted for such a long period. This was the more apparent because of the fact that this species in past years was seen daily until the middle of April, and was a common bird during the early spring months. It will be interesting to note its relative abundance during the coming fall migration.—THOS. D. BURLEIGH, *U. S. Fish and Wildlife Service, Gulfport, Mississippi.*

RECENT LITERATURE

Audubon's 'Birds of America,' 1941.—The success of the 1937 edition of Audubon's plates in a single volume which sold for $12.50, was so far beyond expectations, that the publishers now bring out this new edition[1] at a price that will be even more popular. The chief difference is, however, that only the 435 plates of the original elephant-folio set are now reproduced, while the 65 additional plates of the previous volume are omitted. The frontispiece shows the fine Cruickshank portrait of Audubon, and there is the same introductory Preface by William Vogt. The four lines of text at the bottom of each plate, in double column, were prepared by the same author and give in briefest form the range, habitat, identification marks, voice, breeding and food habits, or in certain cases special notes. At the back of the volume is a list of the original legends to the plates together with an index of the common names of the species shown.

Printed from the same set of plates used in the previous edition, the vivid figures are in the main well reproduced, except that as in all such color work, there are occasional instances where the colors seem too red or too pale or in some other way are not quite as they should be. But it must be remembered too, that the originals are not maps of the birds' colors but rather show the color values as they appeared to the artist's eye. The avidity with which the public absorbed the previous edition indicates the wide desire for a set of the famous plates at a moderate price. This new volume now makes them available to nearly all who are interested in Audubon and his work.—G. M. Allen.

'Factors Affecting the General Status of Wild Geese and Wild Duck.'—Although this report[2] is volume one of the International Wildfowl Inquiry, volume two has already been published and reviewed in 'The Auk,' 57: 583–584, 1940, to which the reader is referred for information on background. The inquiry is European in scope, and indeed the two reports so far issued are the work of an English committee; the North American references are entirely incidental. Curiously enough, the whole project seems to have been set in motion by "the startling news . . . that the United States of America had practically limited the shooting of wild duck to one month in the year, [which] pointed to a grave state of affairs." On the showing of the present report, and making due allowance for the profound differences in hunting methods and pressures on the two continents, it may be wondered whether waterfowl conditions are not quite as unfavorable in Europe as in North America, and much less susceptible of quick improvement.

There are eight separate papers in this collection, dealing with as many different topics and each prepared by a different author or group of authors. The general effect is to outline the more pressing aspects of the problem, summarize existing information, and thus prepare the way for both action and further detailed investigation. The first section is introductory, and lists nine factors which have operated in recent years to decrease European waterfowl. At least five of these are of world-wide importance:—increased facilities of travel, commercialization attendant on improved methods of cold storage, increased penetration of the

[1] **Audubon, John James. The Birds of America with a Foreword and descriptive Captions by William Vogt. Large 8vo, xxvi pp., 436 pls., 1941; The Macmillan Co., New York City. Price $4.95.**

[2] **International Wildfowl Inquiry / Volume I / Factors Affecting the General Status of Wild Geese and Wild Duck / 8vo, x + 123 pp., 22 figs. and maps, 1941; Cambridge University Press, The Macmillan Co., New York City. Price $2.25.**

far North by man, ill-considered reclamation of swamp-land, and intensive agricultural methods.

A series of reports on breeding conditions in the North covers Greenland, Iceland, Spitsbergen and Norwegian Lapland. Northeast Greenland appears to be the great reservoir of supply for those Brant, Barnacle Geese, and Pink-footed Geese which winter in the British Isles, and because of its extreme inaccessibility is rated as safe "for many years to come." In Iceland the breeding Pinkfeet are nearly extirpated as a result of unrestrained egging, and numerous species of ducks are severely reduced by local agricultural practises. In Spitsbergen, Eiders, Barnacles, Brant, and Pinkfeet are levied upon mercilessly by sealers and egg-hunters from Norway; the Eiders can stand it, but the geese and particularly Brant, are in a precarious position. Lapland is considered satisfactory.

A well-balanced paper on the status and significance for waterfowl of certain aquatic plants of the genera *Zostera, Ruppia, Potamogeton, Zannichellia, Ulva,* and *Enteromorpha* supplies background information for the English worker, but has nothing not already familiar to the American. A survey of British 'decoys' (the name used for a system of netting wild ducks in large water-traps) indicates that they are dying out rapidly, at least on a commercial scale, with the total average catch now running to only about 12,000 per year. The decoy system in Holland, on the contrary, is powerfully intrenched and is estimated to take at least a million ducks a year—possibly one and one-half million. The business has gone on for centuries, however. A survey of punt-gunning in the British Isles tends to show that this much-criticized method of taking waterfowl is not unduly harmful *per se*—that average daily and yearly bags are very much smaller than usually claimed by opponents of the practise. Punt-gunning having long since faded from the American scene, the argument need not be further reported. Two papers on the results of duck-banding in England and on the Continent, with excellent maps showing distribution of recoveries, are chiefly of interest to the English waterfowl-manager. The material on which they are based does not approach American data for quantity or coverage, and no new principles are adduced.

The eighth paper, on "close time," is certain to shock the American reader quite as much as European ornithologists may have been dismayed by a one-month open season in the United States. It appears that the most recent legislation in the British Isles provides a closed season from February 1 to *August 11*, except that on tidal shores shooting may be continued by local ordinance until *February 20*. Sale of waterfowl is permitted between August 11 and February 28. Importation is legal between August 11 and February 1. Further, a careful compilation of the regulations for other European countries shows the shooting season starting *June 1* in Czechoslovakia, July 1 in Austria, July 15 in Rumania and Belgium, July 16 in Germany, July 18 in France, August 2 in Holland; closing March 31 in France and Germany, April 15 in Austria, Belgium and Bulgaria and *May 31* in Poland.

Summing up the book as a whole, it represents an intelligent start on problems which were attacked on this continent at least twenty-five years ago. The reviewer's principal reaction is a renewed and grateful comprehension of the advantages which North Americans have at hand in the fight to save waterfowl. On this side, we see Americans and Canadians working harmoniously for the protection of a stock of waterfowl whose vast range lies almost wholly within the

political control of two friendly governments. In England on the contrary, an attempt to improve the status of waterfowl is handicapped at once by the fact that breeding ranges and migration routes lie in or over Greenland, Iceland, Spitsbergen, at least seven existing or former Scandinavian and Baltic countries, and three or more southern European countries, the governments of all but Greenland, Iceland, and Russia being at present hostile, captive, or in exile. The comparison is thought-provoking far beyond the realm of ornithology.—JOSEPH A. HAGAR.

Ridgway and Friedmann's 'Birds of North and Middle America' Part 9.—Twenty-two years have elapsed since the publication, in June 1919, of Part 8 of this great systematic work on North American birds. Dr. Friedmann, as Ridgway's successor, now gives us Part 9, containing a concise review[1] of the Gruiformes found from Panama to the arctic regions, and in his brief Introduction tells us that the tenth part, containing the Galliformes, is in preparation. On the death of Robert Ridgway, the late Dr. Charles W. Richmond assembled all available manuscript notes of Ridgway, which covered diagnoses of genera and higher groups as well as partial synonymies for many species and subspecies. Wherever possible these have been utilized by Dr. Friedmann who has modestly desired that the continuation of the work should as far as possible be Ridgway's. Nevertheless it has been a task of magnitude to coordinate all this material, to bring the literary references to date, and to make the final parts reflect the state of current knowledge. In the intervening years four volumes of Peters's 'Check List of Birds of the World' have appeared, which, beginning with the 'lower' groups and proceeding to the 'higher' forms, treat them therefore in reverse order from Ridgway whose first part commences with the Fringillidae. In the present Part 9, Dr. Friedmann has accordingly arranged the families, genera and species to conform with Peters's treatment in order that the two works shall offer the least amount of difficulty in following them.

In all, seventy-two species and subspecies are formally treated, representing five families; in addition a number of allied extra-limital forms are included in the keys to facilitate comparisons. The full diagnoses of order, families, genera and species with their races will be of great value to all systematists as well as to others wishing in concise form a statement of the trenchant characters. Sixteen well-executed text-figures show the important characters of bill, feet, wings and tail. The final account of each form includes a description of all the plumages, the measurements, range in summer and winter, the type locality and the important references in literature. The last item is brought down to date and forms a convenient index to the more important papers. A few changes, such as the relegation of the North American clapper rails to subspecific rank under *Rallus longirostris* of South America, as proposed by Oberholser, and the use of *Laterallus* and *Porphyrula* for *Cresiscus* and *Ionornis* of the last A. O. U. 'Check-list' are adopted with proper synonymy.

A very few printers' errors were detected: the misspelling of Jaques on page 18 and of Dover, N. H., on page 200 were noted in passing; also the use of Roman numerals for volume numbers in the synonymies might now be given up since the Arabic numerals are less liable to produce mistakes in reading or copying. It is a satisfaction to know that this great work is now continuing after a long

[1] Ridgway, Robert, and Friedmann, Herbert. 'The Birds of North and Middle America.' Bull. U. S. Nat. Mus., no. 50: ix + 254 pp., 16 figs., Oct. 1941. Price in paper covers, 40 cents (Superintendent of Documents, Washington, D. C.).

breathing-space and under the able authorship of Dr. Friedmann, may in time be carried to completion.—G. M. ALLEN.

Tyson and Bond's 'Birds of Mt. Desert Island, Acadia National Park' is another local guide to birds likely to be seen by the summer visitor, especially in the Acadia National Park. It assumes, however, that the casual tourist is already somewhat familiar with eastern birds and has access to some one of the various handbooks for identification of any unfamiliar species. These are therefore listed in the main chapter on summer birds in the 'Check-list' order, by vernacular names only, with for each a few brief remarks on characteristic ways or notes or distribution in the region. Following sixteen half-tone plates of common species in the center of the booklet, there is a briefly annotated list of birds reported from the island and its outlying islets and from the adjacent mainland of Hancock County, with Latin and common names.

It is now over thirty years since the appearance of Knight's 'Birds of Maine' in 1908, hence the more particular value of the work may lie in the fact that it brings to notice various changes that have taken place in the local avifauna and adds a few important records (as well as some admittedly doubtful). Among interesting changes in recent years are: increase of certain nesting species as Great Black-backed and Herring Gulls, to which the authors suggest the steady decline in numbers of terns may be due, through their usurping the terns' nesting areas. Ravens have become more numerous on the outlying islands, while Winter Wrens have at the same time dwindled in numbers owing to clearing of undergrowth by C. C. C. boys. The Ruby-crowned Kinglet, it is interesting to note, is "now fairly common and widespread as a summer resident on Mt. Desert Island" though formerly very rare, while Lincoln's Finch is now found to breed both on the island and on the adjacent mainland. It would have added much to the value of this booklet[1] if such changes could have been given in more detail. However, it was doubtless the design of the authors to provide merely a stimulus and guide for summer people. The guide is of pocket size, clearly printed, and bound in stiff paper covers and should prove useful to those visiting the region.—G. M. ALLEN.

Mrs. Wheeler's 'We Follow the Western Trail' is a nature-lover's book[2] written by an enthusiastic camper and observant outdoor-liver, telling of inspiring summer outings chiefly in the mountains and coasts of California where, on foot and by automobile, much thrilling scenery was reached, abundant bird life watched, and other minor adventures lived. The volume holds a good deal of interesting detail, some of it well presented, as in the chapter on forest fires; and always the author and her family have much to see and photograph. While there is no pretense of producing a work on natural history, there is much that is interesting as a picture of phases of bird life, such as the nesting of Rosy Finches with the excellent photographs of these high-altitude birds, while other species afford a comfortable variety. The book is intended rather for pleasant companionship to encourage others to go forth and allow their emotional feelings to be stirred by the splendors of the western scenery and its wild life. Not too large, nor too long, it is of convenient size for perusal at one or two sittings and is not too expensive.—G. M. ALLEN.

---

[1] Tyson, Carroll, and Bond, James. Birds of Mt. Desert Island, Acadia National Park, Maine. sm. 8vo, 82 pp., 16 pls., map, 1941; Academy of Natural Sciences, Philadelphia, Penna. Price $1.00.

[2] Wheeler, Ruth. We Follow the Western Trail. 8vo, xiv + 160 pp., illustr., 1941; The Macmillan Company, 60 Fifth Ave., New York City. Price $2.00.

Kendeigh's 'Territorial and Mating Behavior of the House Wren' is a well-prepared summary of the essential points involved in the choice and function of the breeding territory and in the mating activities of the House Wren, gleaned from the minute study of the species over a nineteen-year period at the Baldwin Bird Research Laboratory near Cleveland, Ohio. It is thus perhaps the longest continuous study of a limited population of any species of bird yet published in which, through banding, the activities of individual birds have been carefully followed season by season.

Much of the method of the work is now familiar from previously published papers. Over successive breeding periods the 'territories' delimited by the settled male birds have been mapped, the doings of each pair have been followed and the various changes of territory in successive broods and seasons have been recorded. The males arrive first, and in successive years the adult males tend to arrive slightly earlier with increasing age. The earlier arrivals are therefore the older males which select their territories and examine available nest sites within the territory, marking each with a few or more sticks laid in as if in preparation for a nest. Females arrive somewhat later and often remate with the same male as in the preceding year. Approximately three-fourths of all adult birds tend to renest within a thousand feet of the spot where they nested the year before. While the male defends his chosen area, the female is less concerned with its exact limits. The practised observer can distinguish three types of song by the male, a territory song, a mating song, and a nesting song, each associated with a different emotional state at the nesting period. Defense reactions in holding territory are carefully described, and it is shown that minute differences in behavior may be of considerable meaning. Variation and changes in the territorial limits occur as nesting proceeds or with successive broods.

Other chapters deal with reproductive vigor, mating behavior, and the progress of the cycle. Finally there is an extensive series of individual case histories illustrating with maps and descriptions the changes in territorial limits from brood to brood and from year to year. An interesting account is given of the relations with other hole-nesting competitors especially the Bluebird and the English Sparrow. The average territory is about one acre in extent, but varies inversely with the size of the breeding population. There is a non-breeding population of wrens amounting to from 28 to 35 per cent of the total male population, and roughly half as many non-breeding females. Polygyny occurs in about 6 per cent of all nestings, and there is an interesting comparison with other species of wrens in which this type of mating is known. Since the young birds scatter and appear in later years in very small proportion, there is small chance of inbreeding.

These and many other interesting points observed over the period of years conduce to make this[1] a paper of first importance in the exact study of wren behavior.—G. M. ALLEN.

Griscom and Greenway's 'Birds of Lower Amazonia.'—This important report[2] is based chiefly on (1) a collection of over 4000 skins secured by A. M. Olalla in 1932 and 1933, and now in the Museum of Comparative Zoology; (2) the great Klages collection of over 7300 specimens in the Carnegie Museum at Pittsburgh;

[1] **Kendeigh, S. Charles.** 'Territorial and Mating Behavior of the House Wren.' Illinois Biological Monographs, 18: no. 3, 120 pp., 1941; Univ. of Illinois Press, Urbana, Ill. Price $1.50.

[2] **Griscom, Ludlow, and Greenway, James C., Jr.** 'Birds of Lower Amazonia.' Bull. Mus. Comp. Zoology, 88: 83–344, June 1941.

and (3) a thorough survey of pertinent literature. In the task of identifying carefully all this material, the authors have compiled a list of all species known from the western boundaries of the State of Pará, eastward along the Amazon River, to the sea, including therefore a vast stretch of the lower Amazon Valley, on both banks of the great river. Owing to the fact that this is country traversable chiefly by water, the collecting stations are along the larger tributaries and the intervening banks of the Amazon.

Dr. Snethlage's 'Aves Amazonicas' of 1914 is now long out of date so that this modern and critical estimate of the birds of the region is very welcome and not only affords a better view of the avifauna but also adds many overlooked older records. In all, 972 species and subspecies are listed, a relatively large number, of which only 42 are regarded as migrants or winter visitants while of these all but nine are from the north and include mainly waterbirds. The Amazon Valley shows very little relief and was regarded by Dr. Snethlage as showing three main types of ecological habitat: (1) low land subject to flooding in the rainy season, and including (a) primeval forest and (b) open savannahs or *campos;* (2) higher ground, never flooded, with again primeval forest and savannahs; and (3) scrub growth of at least two types where the original forest has been destroyed. There are nevertheless in this relatively uniform moist-tropical forest, ecological areas, where local subspecies differentiate or local endemic species survive. The larger rivers themselves often form ecological barriers for some birds but not for others. Thus the ant-birds break up into numerous subspecies but other groups in the same area may not show corresponding changes. There are numerous exceptions and anomalies so that few general rules can be established; but at least six groups of species can be recognized as having distinct types of distribution. Thus the greatest number of endemic species is found on the south side of the Amazon, while again there is evidence of a relatively recent invasion from the west, north and south that may still be going on.

In a previous paper, published in 1937, the authors have described a number of new forms and Mr. Todd has published several papers on the novelties in the Klages collection. Only one new race is added in the present paper, a cuckoo, *Neomorphus squamiger iungens,* from Boim, Tapajos River. In the list of species, the type locality of each is given, with a summary of previous records, and then a list of the specimens in the Olalla collection. There is much comment with useful critical observations, which render this a valuable and suggestive paper. At the same time the treatment is conservative and the authors point out how little is really known of the habitat preferences of literally hundreds of species. A surprising record is that of Dr. Snethlage of the Brown Pelican on the Rio Tapajos. The Water-turkey of Brazil is typical *Anhinga anhinga anhinga,* a series of which made possible for the first time a careful comparison with Florida birds. As a result, it appears that the latter are smaller, with shorter bills, while the tail-tip is much narrower (at least half as wide). For this northern race, Vieillot's name is revived and the bird of Cuba and southern United States should stand as *Anhinga anhinga leucogaster,* type locality Florida.

A brief bibliography lists important papers since the inclusive works of Snethlage and Hellmayr, but an index is lacking. The paper forms an important milestone in our knowledge of the lower Amazonian avifauna.—G. M. Allen.

Palmer on Behavior of Common Terns.—This study[1] of the Common Tern is not intended to be a summary of all known facts but a description and analysis of behavior and a discussion of relevant observations. The data were obtained on the coast of Maine during the seasons of 1938 and 1939. Part I describes the environment in the breeding season, pointing out that isolation, adequate food, and suitable topography for nesting sites are the three requirements for a nesting colony.

Part II discusses behavior in detail. The birds do not come to the actual nesting territory for several days after their arrival in the vicinity of the nesting sites. The occupation of the ternery occurs during the performance of a mutual 'fish flight,' in which either sex may take either part. Courtship consists of certain posturing, parading, the making of scrapes, and aerial glides. Sex is discriminated on the ground near the nest site by means of behavior. The sexual bond is maintained in part by the aerial glide. The pair possesses a 'sexual' (nesting) territory about three feet in diameter from which intruders are expelled by both sexes. The birds congregate on a common ground for resting and preening. Posturing serves at least five different uses in the breeding activities of the pair. Copulation occurs after preliminary ceremonies. The eggs, laid in one of the numerous scrapes, are incubated for an average of 23 days, principally by the female. Substitute activities are prominent in the life of terns, consisting of preening, playing with nesting material, making scrapes, and courting. Social reactions during the breeding cycle consist of up-flights, social attack on predators, fishing, bathing, flocking and preening. The birds leave the ternery in small groups after the breeding is completed.

The above summary gives some indication of the mass of observational detail contained in this report. A few points of adverse criticism occur to the reviewer. The author does not state the dates of his observations on the colony. Many references of an inconsequential nature are included (e. g., Shaw on p. 16). The use of the term "social parasites" (p. 28) in reference to jaegers is confusing to those accustomed to the accepted usage in reference to Cowbirds. On p. 34 a figure of 35% mortality of chicks is given without supporting data. On p. 43, the author suggests that the pair remains mated over the winter period. Another possible explanation of the fact that the same birds are paired in more than one season, is that both return to the same territory, thus, in truth, repairing. The likelihood that pairing is hormonally controlled suggests that, since these substances are not present in the non-breeding season, the sexual bond is not maintained throughout the year. Some topics (e. g., ovulation, p. 68) are extensively treated without reference to the Common Tern. The pertinence of this compilation of the literature is not apparent to the reviewer. One last point seems worthy of emphasis. Much use is made of the hypothesis that behavior of other individuals influences, through the mediation of the pituitary, the activities of the gonads. This hypothesis as yet has no experimental endocrinological support and is so oft repeated in zoological writings that it is in danger of becoming accepted as a fact. Until we have adequate experimental evidence, the hypothesis of the 'synchronization' of the sexes should be used with caution. The report greatly increases our knowledge of the actions of the birds and the thirty line-drawings, traced from photographs, are an excellent contribution to the technic for studying behavior.—David E. Davis.

[1] Palmer, Ralph S. 'A Behavior Study of the Common Tern (*Sterna hirundo hirundo* L.)'. Proc. Boston Soc. Nat. Hist., 42: 1–119, charts 1–2, plates 1–14, 1941.

PERIODICAL LITERATURE

ARCHEY, GILBERT. The Moa, a study of the Dinornithiformes. Bull. Auckland Inst. and Mus., no. 1, 145 pp., pls., 1941.—A comprehensive review of the known species.

ASHLEY, JAMES F. A study of the structure of the humerus in the Corvidae. Condor, **43**: 184–195, fig. 50–56, July 15, 1941.—With a key to the bone in North American Corvidae.

BARBER, OLIVE. Juvenile Marbled Murrelet found on Coos River. The Murrelet, **22**: 38–39, Sept. 15, 1941.

BARGER, N. R., ED. May field notes. Passenger Pigeon (Madison, Wisc.), **3**: 57–60, June 1941.

BARGER, N. R., ED. June field notes. Passenger Pigeon, **3**: 65–67, July 1941.

BARGER, N. R., ED. July field notes [from Wisc.]. Passenger Pigeon, **3**: 73–74, Aug. 1941.

BARGER, N. R. Quest of the Worm-eating Warbler in Wisconsin. Passenger Pigeon, **3**: 75, Aug. 1941.—One seen on May 18.

BARKER, BYRON W. Cormorants nesting in trees. Oölogist, **58**: 65–66, 2 figs., June 1941.—On islands of the Maine coast.

BARNES, R. M. A new and valuable natural history discovery. Oölogist, **58**: 65, June 1941.—Great Blue Heron captures a very young muskrat.

BASKETT, THOMAS S. Production of pheasants in north-central Iowa in 1939. Journ. Wildlife Management, **5**: 168–174, April 1941.—A forty per cent loss of nests by predation.

BAUMGARTNER, M. D. Notes on bird migrations in 1941 in Marion County. Indiana Audubon Year Book, **19**: 28–30, 1941.

BEHLE, WILLIAM H. A collection of birds from the La Sal Mountain region of southeastern Utah. Wilson Bull., **53**: 181–184, Sept. 1941.

BENE, FRANK. Experiments on the color preference of Black-chinned Hummingbirds. Condor, **43**: 237–242, 5 figs., Sept. 18, 1941.—Evidence shows that the bird is not attracted to red more than to any other color.

BLACKMAN, THOMAS M. Feathered airmen of Midway Islands. Natural History (New York), **48**: 173–180, Oct. 1941.—With excellent photographic studies of the seabirds of these islands.

BOARDMAN, EDWARD T. Our mystery bird. Jack-pine Warbler, **19**: 67–69, pl. 5, July 1941.—Least Bittern nesting in Michigan, with photographs.

BOND, JAMES, AND DE SCHAUENSEE, RODOLPHE MEYER. Description of a new puffbird from the lower Amazon. Notulae Naturae, Acad. Nat. Sci. Philadelphia, no. **50**: 2 pp., July 11, 1940.—*Nystalus striolatus torridus* from Belem.

BOTSFORD, HARRY. The Little Quaker. American Forests, **47**: 466–468, 4 figs., Oct. 1941.—The American Woodcock photographed as adult and its eggs and young.

BRODKORB, PIERCE. The Pygmy Owl of the District of Soconusco, Chiapas. Occas. Papers Mus. Zool. Univ. Michigan, no. 450, 4 pp., Oct. 9, 1941.—Describes *Glaucidium brasilianum saturatum* from Finca Esperanza, Chiapas.

BROOKS, ALLAN. The Loon as a duck killer. Condor, **43**: 197, July 15, 1941.

BROOKS-KING, M. Intelligence tests with tits. British Birds, **35**: 29–32, July 1, 1941.—An account of the birds' actions in securing food from feeders.

BRYANT, C. E. Photography in the swamps: the Reed-warbler. Emu, **40**: 257–260, pl. 48, Jan. 1941.

BRYANT, C. E. Photography in the swamps: the Black-fronted Dotterel. Emu, **41**: 54–56, pl. 14, July 1941.

BUDDLE, G. A. Birds of the Poor Knights. Emu, **41**: 56–68, pls. 15–16, July 1941.—Account of birds on these small islands off New Zealand.

BUDENSTEIN, G., AND SCHUZ, E. Erstnachweis von *Larus argentatus antelius* Ired. für Deutschland. Ornith. Monatsber., **49**: 49–56, 3 figs., Apl. 15, 1941.

BURTCH, VERDI. American Bittern brooding the eggs of a Florida Gallinule. Oölogist, **58**: 47, Apl. 1941.—At Lake Keuka, N. Y.

CLEBSCH, ALFRED. The Cliff Swallows of Swallow Bluff. The Migrant (Memphis, Tenn.), **12**: 21–24, June 1941.

CLEBSCH, ALFRED, AND OTHERS. Symposium on Swainson's Warbler. The Migrant (Memphis, Tenn.), **12**: 27–31, June 1941.—Notes on its habits in Tennessee.

COLE, RANDALL K. Genetic resistance to a transmissible sarcoma in the Fowl. Cancer Research, **1**: 714–720, Sept. 1941.

CONOVER, H. B. A new race of *Nettion andinum* from Venezuela. Proc. Biol. Soc. Washington, **54**: 143–144, Sept. 30, 1941.—A 'lighter' bird than the Andean race.

CORTI, ULRICH A. Ornithologische Notizen aus dem Tessin. II. Der Ornith. Beobachter, L'Ornithologiste, **38**: 75–93, July 1941.

CRUTTENDEN, JOHN R. Additional nesting data on the birds of Churchill. Oölogist, **58**: 62–64, June 1941.—Harris's Sparrow found nesting.

CRUTTENDEN, JOHN R. Young Red-tailed Hawks. Oölogist, **58**: 83–84, July 1941.—Notes on individual development.

CUSHING, JOHN E., JR. Non-genetic mating preference as a factor in evolution. Condor, **43**: 233–236, Sept. 18, 1941.

DAVIS, DAVID E. The belligerency of the Kingbird. Wilson Bull., **53**: 157–168, Sept. 1941.—The male appears to defend the nest site and sex partner, while the female defends the latter only.

DAVIS, WILLIAM H. The nesting habits of the European Tree Sparrow. Oölogist, **58**: 82–83, July 1941.

DEADERICK, WILLIAM H. A history of Arkansas ornithology. Amer. Midland Naturalist, **26**: 207–217, July 1941.—A review of ornithological discovery in the State.

DE CAMPS, E. D. Nesting records for Beaufort County, South Carolina birds 12/19/39–7/9/40. Oölogist, **58**: 70–71, June 1941.

DEIGNAN, H. G. Remarks on the Kentish Plovers of the extreme Orient, with separation of a new subspecies. Journ. Washington Acad. Sci., **31**: 105–107, Mar. 15, 1941.—In addition to the typical race, the author recognizes as new *Charadrius alexandrinus nihonensis* from Aomori, Hondo, Japan.

DELACOUR, J. Geese I had at Clères. Avic. Mag., (5) **6**: 138–141, 1941.

DELACOUR, JEAN. On the species of *Otus scops*. Zoologica, N. Y. Zool. Soc., **26**: 133–142, 10 figs., Sept. 8, 1941.—List of races with descriptions of this widely distributed owl, in Europe, Asia, and Africa, as well *O. s. flammeolus* of western North America and *O. s. rarus* of the Guatemalan highlands.

DU MONT, PHILIP A. Relation of Franklin's Gull colonies to agriculture on the Great Plains. Trans. Fifth No. Amer. Wildlife Conference, 183–189, 1940.—A very beneficial species, feeding largely on grasshoppers.

EATON, JOHN W. Brief notes on the Fish Crow. Bull. Massachusetts Audubon Soc., **25**: 133–134, Oct. 1941.—With records from southern Massachusetts.

EDGE, MRS. C. N. Third annual report. Hawk Mt. Sanctuary Assn., publ. no. 4, 4 pp., Sept. 1941.—With a summary table by Maurice Broun covering the counts of hawks seen from 1934 to 1940.

ELKINS, FRANCES AND HERVEY. Waiting for the hawks to fly. **Bull. Massachusetts Audubon Soc., 25:** 123–126, Oct. 1941.—At Mt. Tom; a south or southwest wind reduces or stops the flights of south-going migrants.

EMLEN, JOHN T., JR. An experimental analysis of the breeding cycle of the Tricolored Red-wing. Condor, **43:** 209–219, Sept. 18, 1941.

ERRINGTON, PAUL L. Notes on winter-killing of central Iowa Bob-whites. **Iowa Bird Life, 11:** 46–49, Sept. 1941.—Of 46 birds, eighty per cent died.

EZRA, ALFRED. Some rare ducks I have kept. Avic. Mag., (5) **6:** 141–144, 1941.

FAVALORO, NORMAN. Notes on the Blue-and-white Wren. **Emu, 40:** 260–265, Jan. 1941.—In Victoria.

FLEMING, C. A. Notes on the Neozelanic forms of the subgenus *Cookilaria*. **Emu, 41:** 69–80, fig., July 1941.

FITTER, R. S. R. Report on the effect of the severe winter of 1939–40 on bird-life in the area within 20 miles of London. British Birds, **35:** 33–36, July 1, 1941.

FORD, EDWARD R. Sing, happy (?) birds. Jack-pine Warbler, **19:** 92–94, July 1941.

GIBB, J. A. Three Long-tailed Tits feeding one brood. **British Birds, 35:** 59, Aug. 1, 1941.

GILLIARD, E. THOMAS. A naturalist's Mecca in the Panama Canal. **Natural History** (New York), **48:** 100–109, 13 figs., Sept. 1941.

GILMORE, CHARLES W. A history of the Division of Vertebrate Paleontology in the United States National Museum. Proc. U. S. Nat. Mus., **90:** 305–377, pl. 49–53, 1941.—Listing fossil birds in the collection.

GLADSTONE, SIR HUGH. Christopher Merrett and his Pinax Rerum Naturalium Britannicarum. British Birds, **35:** 73–80, Sept. 1, 1941.—With an account of this rare book.

GORRELL, PAULINE H. My Audubon Association wild life tour at Lake Okeechobee. Indiana Audubon Year Book, **19:** 33–38, 3 figs., 1941.

GOTTSCHALK, JOHN. The sale of bird plumage in Indianapolis. **Indiana Audubon Year Book, 19:** 15–17, 1941.—Illegal sale of plumage investigated.

GRANT, C. H. B., AND MACKWORTH-PRAED, C. W. A new *Alethe* from Tanganyika Territory; a new race of Sparrow Lark from the Sudan; and a new race of Yellow-bellied Eremomela from Angola. Bull. British Ornith. Club, **61:** 61–63, June 20, 1941.—*Alethe lowi* from near Njombe, *Eremopterix leucopareia cavei* from south-eastern Sudan, and *Eremomela griseoflava lundae* from Lunda district, Angola.

GRANT, C. H. B., AND MACKWORTH-PRAED, C. W. Notes on eastern African birds. Bull. British Ornith. Club, **61:** 63–71, June 20, 1941.—Status and distribution of several species.

GREAVES, R. H. Behaviour of White Wagtails wintering in Cairo district. Ibis, (14) **5:** 459–462, July 1941.

GREGORY, JOHN. Notes from the Sharks Bay area, Western Australia. **Emu, 41:** 21–25, July 1941.

GRIFFIN, WILLIAM W. Migration of birds in the Atlanta region. **The Oriole** (Atlanta, Ga.), **6:** 17–23, June 1941.

GRINNELL, LAWRENCE I. Hudson Bay bird metropolis. **Audubon Mag., 43:** 327–336, 8 figs., Aug. 1941.

GRISCOM, LUDLOW. The changing seasons. Audubon Mag., **43:** 381–382, Aug. 1941.

GRISCOM, LUDLOW, AND OTHERS. The season. CXXXVIII. April 1 to June 1, 1941. Audubon Mag., **43:** 386–400 (suppl.), Aug. 1941.

GROMME, O. J. Several interesting breeding records secured. **Passenger Pigeon** (Madison, Wisc.), **3:** 71–72, Aug. 1941.—Connecticut Warbler feeding young at Wescott, Wisc.

HALLIDAY, HUGH M. Servants of the trees. Amer. Forests, **47**: 420–423, 6 figs., Sept. 1941.—Value of birds in forests.

HAMERSTROM, F. N., JR., HOPKINS, FRANK, AND RINZEL, ANTON J. An experimental study of browse as a winter diet for Prairie Chicken. Wilson Bull., **53**: 185–195, Sept. 1941.

HAND, R. L. Birds of the St. Joe National Forest, Idaho. Condor, **43**: 220–232, Sept. 18, 1941.

HARDY, ERIC. The gestation period of wild birds. Ibis, (14) **5**: 462–463, July 1941.—On the interval between copulation and laying.

HEBARD, FREDERICK V. Harlan's Hawk in Georgia. The Oriole (Atlanta, Ga.), **6**: 24, June 1941.

HEMPHILL, FREDERICK A. The Nighthawk. Oölogist, **58**: 52–53, May 1941.—Nesting habits in New Jersey.

HEMPHILL, FREDERICK A. Some collecting experiences in 1940. Oölogist, **58**: 56–58, May 1941.—On the South Carolina coast.

HEMPHILL, FREDERICK A. Notes on the birds of Hunterdon County, New Jersey. Oölogist, **58**: 74–78, July 1941.

HENDERSON, DANIEL W. The Mississippi Kite (*Ictinia misisippiensis*) in Richmond County [Georgia]. The Oriole (Atlanta, Ga.), **6**: 24, June 1941.

HEUSER, G. F. Protein in poultry nutrition—a review. Poultry Science, **20**: 362–368, July 1941.—Recommends 15 to 16 per cent of protein in the food.

HILL, EDWARD A. Winged iridescence. Audubon Mag., **43**: 363–364, 2 figs., Aug. 1, 1941.—Ruby-throated Hummingbird at the nest.

HINDWOOD, K. A. The White-backed Swallow in coastal New South Wales and Queensland. Emu, **40**: 304–307, pls. 56–57, Jan. 1941.—Has recently become a nesting bird on the coast of Cumberland County.

HINDWOOD, K. A., AND SERVENTY, D. L. The Gould Petrel of Cabbage Tree Island. Emu, **41**: 1–20, pls. 1–6, July 1941.—The history, characters and known habits of *Pterodroma leucoptera*. Population of the island is perhaps one hundred pairs. The sticky seeds of *Pisonia* are a frequent menace, incapacitating the birds.

HIRST, ARNOLD. Breeding the Whip-bird in captivity. Victorian Nat., **58**: 11, May 1941.—*Psophodes olivaceus* bred in Australia in captivity.

HITTSON, H. Hummingbirds reproduce in Forest Park Zoo. Parks and Recreation, **24**: 563–565, 1941.—Two female Black-chinned Hummingbirds built in one cage, stealing nesting material from each other. One male courted both females, but only one of them laid eggs.

HOBSON, DOROTHY MADDEN. Bird-banding stations I have visited. Indiana Audubon Year Book, **19**: 18–24, 1941.

HOLMAN, JOHN P. A wintering Woodcock. Bull. Audubon Soc. Conn., p. 2, Apl. 1941.—In Connecticut.

HOLZMARK, WILLIAM I. Black Terns of Missouri marshlands. Audubon Mag., **43**: 351–354, Aug. 1941.—Photographs at close range of nesting birds.

HUGGINS, RUSSELL A. Egg temperatures of wild birds under natural conditions. Ecology, **22**: 148–157, Apl. 1941.—A study of 37 species.

HUGGINS, RUSSELL A. AND SARA E. Possible factors controlling length of incubation in birds. Amer. Naturalist, **75**: 282–285, June 1941.

HUGGINS, SARA E. Relative growth in the House Wren. Growth, **4**: 225–236, 1940.

HUTT, F. B., AND SCHOLES, J. C. Genetics of the Fowl. XIII. Breed differences in susceptibility to *Salmonella pullorum*. Poultry Science, **20**: 342–352, July 1941.—White Leghorns have a characteristic resistance to this organism.

INGRAM, GEOFFREY C. S., SALMON, H. MORREY, AND DEWAR, J. M. The diving habits of ducks and grebes. British Birds, **35**: 22–28, July 1, 1941.

IRWIN, MARGARET. A field trip to the oasis, Twenty-nine Palms, California. Jackpine Warbler, **19**: 76–78, July 1941.—Notes on six species.

JACKSON, A. D. Abstracts of Bulletins No. 581–595, Circulars no. 86–90, and other publications during 1940. Circ. Texas Agric. Exper. Sta., no. 93, 51 pp., July 1941.

JACKSON, MRS. R. E. Song Sparrows assume role of foster parents. Bull. Massachusetts Audubon Soc., **25**: 134–135, Oct. 1941.—Feeding young Yellow Warblers and House Wrens.

KELSO, LEON. Additional races of American owls. Biological Leaflet, no. 13, 2 pp. (privately printed), July 31, 1941.—New races described are: *Otus choliba surutus* from Buenavista, Bolivia; *Bubo virginianus andicolus*, from Ollantaytambo, Peru. In *Strix varia* the ligamentous bridge of the outer ear is found not to be present.

KENDALL, J. B. Observations on nesting habits of the Bluebird. Passenger Pigeon (Madison, Wisc.), **3**: 63–65, July 1941.

KENDEIGH, S. CHARLES. Birds of a prairie community. Condor, **43**: 165–174, July 1941.—In northwestern Iowa.

KENNEDY, P. G. Interbreeding of Hooded and Carrion Crow for the third time in Co. Dublin. British Birds, **35**: 58, Aug. 1, 1941.

LACK, DAVID. Some aspects of instinctive behaviour and display in birds. Ibis, (14) **5**: 407–441, July 1941.—Discussion of the origin, content and survival value of display.

LACK, DAVID, AND LIGHT, WILLIAM. Notes on the spring territory of the Blackbird. British Birds, **35**: 47–53, Aug. 1, 1941.—Territories average two acres and are defended mainly by the males. Song is "apparently, almost functionless."

LACK, H. LAMBERT. Display in Blackbirds [*Turdus merula*]. British Birds, **35**: 54–57, Aug. 1, 1941.

LAIDLAY, J. C. The psychology of geese. Avic. Mag., (5) **6**: 132–135, 1941.—Habits in captivity.

LAMOREUX, W. F. The influence of intensity of egg production upon fertility in the Domestic Fowl. Journ. Agric. Research, Washington, **61**: 191–206, Aug. 1, 1940.—"During periods when the rate of ovulation is low, hens copulate less frequently and probably have a shorter duration of fertility following insemination."

LAMOREUX, W. F. The autosexing Ancobar. Journ. Heredity, **32**: 221–226, July 1941.—In this breed of Domestic Fowl, the downy chicks may be sexed by the amount of black on head and rump.

LAMOREUX, W. F. Photographing domestic birds. Journ. Biol. Photogr. Assn., **9**: 195–200, 3 figs., June 1941.

LESHER, S. W., AND KENDEIGH, S. CHARLES. Effect of photoperiod on molting of feathers. Wilson Bull., **53**: 169–180, Sept. 1941.—White-throated Sparrows, English Sparrows and Bob-white were forced into molt out of season by changing artificially the length of day to which they were exposed.

LITTLEJOHNS, R. T. Songster and dancer unrivaled. Natural History (New York), **48**: 91–95, 13 figs., Sept. 1941.—An illustrated account of the display and other activities of the Lyrebird in Australia.

MACKWORTH-PRAED, C. W., AND GRANT, C. H. B. A survey of the African species placed in the genus *Bradypterus*. Ibis, (14) **5**: 441–455, July 1941.

MANUEL, CANUTO G. Studies on Philippine kingfishers, II. Genera *Alcedo*, *Halcyon*, and *Ramphalcyon*, with additional notes on the genus *Ceyx*. Philippine

Journ. Sci., **74**: 367–382, pl. 1, Apr. 1941.—A new race is *Ceyx goodfellowi virgicapitus* from forests of Tawitawi.

MARCHANT, S. Notes on the birds of the Gulf of Suez.—Part II. Ibis, (14) **5**: 378–396, July 1941.—With migration notes.

MARKLE, M. S. The birds of Bonaventure Island. Indiana Audubon Year Book, **19**: 12–15, 1941.

MARSHALL, A. J., AND HARRISSON, T. H. The comparative economy of closely related birds on an island and a continent. Emu, **40**: 310–318, Jan. 1941.—Island tendencies are toward sedentary habit, lack of sociability, decrease in voice, stronger nests, smaller clutches and food specialization.

MARTIN, CYRIL E. Multiple nest building by Spotted Flycatcher. British Birds, **35**: 81, Sept. 1, 1941.—With editorial comment.

MATHEWS, GREGORY M. Nomenclatural notes. Emu, **41**: 80–83, July 1941.

MAYR, ERNST. Birds collected during the Whitney South Sea Expedition. XLIII. Notes on New Guinea birds. VII. Amer. Mus. Novitates, no. 1091, 3 pp., Nov. 15, 1940.

MAYR, ERNST. Birds collected during the Whitney South Sea Expedition. XLV. Notes on New Guinea birds. VIII. Amer. Mus. Novitates, no. 1133, 8 pp., Aug. 6, 1941.—Describes as new *Falco peregrinus nesiotes* from the New Hebrides; critical notes on other eastern birds.

MAYR, ERNST. Taxonomic notes on the birds of Lord Howe Island. Emu, **40**: 321–322, Jan. 1941.

MAYR, ERNST. Ueber einige Raubvögel der Kleinen Sunda-Inseln. Ornith. Monatsb., **49**: 42–47, Apl. 15, 1941.—New races are: *Accipiter fasciatus sava* from Savu Island; *Falco moluccensis javensis* from Cheribon, Java, and *F. m. timorensis* from Tjamplong, Timor.

MAYR, ERNST, AND RIPLEY, S. DILLON. Birds collected during the Whitney South Sea Expedition. XLIV. Notes on the genus *Lalage* Boie. Amer. Mus. Novitates, no. 1116, 18 pp., June 3, 1941.—With descriptions of fourteen new island races.

MAYS, ALFRED S. Observations on duck disease at Tulate Lake basin, 1940. California Fish and Game, **27**: 154–164, figs., July 1941.—The primary cause of botulism affecting the birds is the diversion of water from the lake and its tributary streams for irrigation exposing mud flats where the organism propagates that causes the disease. Of 5437 birds, four-fifths were rescued.

MCDARRA, JAMES J. Bird-banding. Emu, **40**: 290–304, Jan. 1941.—On need for organization of this activity in Australia.

MILLER, ALDEN H. Racial determination of Bewick Wrens in the western Great Basin region. Condor, **43**: 250–251, Sept. 18, 1941.—Regards birds of the Modoc-Warner region as representing the race *atrestus* Oberholser.

MILLER, EDWIN V. A nest of Bewick Wrens. The Gull (San Francisco), **23**: 31–32, Sept. 1941.

MILLER, LOYE. The directive sense in migrant birds. Condor, **43**: 196, July 15, 1941.

MOODY, A. F. Some unusually kept ducks in the Lilford Collection. Avic. Mag., (5) **6**: 136–137, pl., 1941.

MOORMAN, ROBERT, AND HENDRICKSON, GEORGE O. The 1940 Bob-white season in southeast Iowa. Iowa Bird Life, **11**: 42–46, Sept. 1941.

MOREAU, R. E. A new race of the Pigmy White-browed Robin-chat and a new race of the Mountain Greenbul from Tanganyika Territory. Bull. British Ornith. Club, **61**: 60–61, June 20, 1941.—*Cossypha polioptera kungwensis* and *Arizelocichla tephrolaema kungwensis* from the Kungwe Mountain forests.

MUELLER, C. D., AND HUTT, F. B. Genetics of the Fowl. 12.—Sex-linked, imperfect albinism. Journ. Heredity, **32**: 71–80, Feb. 1941.—Black pigment is present in the eye and very faintly in the plumage.

MUNRO, J. A. Cackling Goose and sheep. Condor, **43**: 200, 2 figs., July 15, 1941.—A wintering goose on Vancouver Island, spends its time throughout six months in company with a flock of sheep.

MURPHY, ROBERT CUSHMAN. The Askoy Expedition of the American Museum of Natural History in the eastern tropical Pacific. Science, **94**: 57–58, July 18, 1941.

NEFF, JOHNSON A. A note on the food of Burrowing Owls. Condor, **43**: 197–198, fig., July 15, 1941.—A California 'den' showed wings of nestling Black Terns and juvenal Tricolored Red-wings among the food debris.

NESTLER, RALPH B., AND BAILEY, WOODROW W. Bobwhite Quail propagation. Conservation Bull., U. S. Dept. Int., no. 10: 1–50, 43 figs., 1941.

NICHOLS, DAVID G. A bird's choice. The Gull (San Francisco), **23**: 32–33, Sept. 1941.—Green-backed Goldfinch nesting in city of Berkeley, California.

NICHOLS, MONIQUE. Cliff Swallow nests in northwest Berkeley. The Gull (San Francisco), **23**: 27–28, Aug., 1941.

NICHOLS, MONIQUE N. Duck Hawk versus Forster Tern. The Gull (San Francisco), **23**: 35–36, Oct. 1941.—Hawk chasing terns.

ORR, ROBERT T. Ravens in San Francisco. The Gull (San Francisco), **23**: 23, July 1941.

O'SHANE, ROY. Feathered battalion again takes wing. Natural History (New York), **48**: 70–76, 11 figs., Sept. 1941.—An account of the use of Carrier Pigeons in warfare, ancient and modern.

PAHRMAN, C. F. A set of Marsh Hawk eggs. Oölogist, **58**: 46–47, Apl. 1941.—Of five eggs.

PARKS, G. HAPGOOD. Junco jottings. Oölogist, **58**: 38–41, Apl. 1941.—Habits of Slate-colored Junco on Mt. Desert Island, Maine.

PAYN, W. H. The plumage changes of adolescent Shovelers. Ibis, (14) **5**: 456–459, July 1941.

PHILLIPS, W. W. A. Our wild pigeons and doves. Loris, a Journ. of Ceylon Wild Life, **2**: 202–212, 4 figs., June 1941.

PHILLIPS, W. W. A. Some ornithological observations. Loris, a Journ. of Ceylon Wild Life, **2**: 234–238, June 1941.

PICKENS, A. L. A check-list of bird-names in Cherokee. Neighborhood Research (Paducah, Ky.), **5**: 116–118, 1941.

PICKERING, CHARLES F. Interesting days on Reelfoot Lake. The Migrant (Memphis, Tenn.), **12**: 24–26, June 1941.

PICKWELL, GAYLE. Above Mount Rainier's timberline. Audubon Mag., **43**: 337–345, 8 figs., Aug. 1941.—Bird life with photographs.

PRAED, C. W. MACKWORTH. Woodcock's method of carrying young. British Birds, **35**: 61–62, Aug. 1, 1941.

RAND, A. L. Results of the Archbold Expeditions. No. 33. A new race of quail from New Guinea; with notes on the origin of the grassland avifauna. Amer. Mus. Novitates, no. 1122, June 11, 1941.—*Excalfactoria chinensis novaeguinae* is named from Snow Mts.

RAND, A. L. Results of the Archbold Expeditions. No. 34. Development and enemy recognition of the Curve-billed Thrasher, *Toxostoma curvirostre*. Bull. Amer. Mus. Nat. Hist., **78**: 213–242, Aug. 7, 1941.—Probably had to learn what not to fear.

RANGER, GORDON. Observations on *Lophoceros melanoleucos melanoleucos* (Lichtenstein) in South Africa. Ibis, (14) **5**: 402–407, July 1941.

RAPP, WILLIAM F., JR. A Swallow-tailed Kite in New Jersey. Wilson Bull., **53**: 196, Sept. 1941.—One seen at Edgar's Dock, May 19, 1940.

REICHLING, HERMANN. Der Dümmer, eine neue Besiedlungsstätte der Kolbente, *Netta rufina* (Pall.). Ornith. Monatsber., **49**: 47–49, Apl. 15, 1941.

REIMANN, EDWARD J. Echoes from the mangroves. Oölogist, **58**: 43–45, Apl. 1941.

REIMANN, EDWARD J. The Sooties of Shark Island. Oölogist, **58**: 50–52, May 1941. —Nesting of Sooty Terns in the Dry Tortugas, Florida.

RICHDALE, L. E. A brief summary of the history of the Yellow-eyed Penguin. Emu, **40**: 265–287, pls. 49–54, Jan. 1941.—Breeding cycle and other habits.

RICHDALE, L. E. The Erect-crested Penguin (*Eudyptes sclateri* Buller). Emu, **41**: 25–53, pls. 7–13, July 1941.—An excellent life history with illustrations.

RODECK, HUGO C. Unusual nests of Colorado birds. Condor, **43**: 181–183, 3 figs., July 15, 1941.

ROMANOFF, ALEXIS L. Development of homeothermy in birds. Science, **94**: 218–219, Aug. 29, 1941.—True homeothermy is not acquired by the Domestic Chick until the fourth or fifth day after hatching.

ROSS, WINIFRED M. Aërial display by a pair of Golden Eagles. British Birds, **35**: 82–83, Sept. 1, 1941.

SAWYER, EDMUND J. On drawing and painting birds. The Murrelet, **22**: 27–29, pl. and figs., Sept. 15, 1941.

SCHIFFERLI, A. Tätigkeitsbericht der Vogelwarte Sempach für die Jahre 1939 und 1940. Der Ornith. Beobachter, L'Ornithologiste, **38**: 58–74, June 1941.

SCOTT, THOMAS G. Feeding by Turkey Vultures at dens of the northern plains red fox. Ecology, **22**: 211–212, Apl. 1941.—Vultures visit red fox dens for food remnants.

SERVENTY, D. L. Another specimen of the Crested Penguin in Western Australia. Emu, **40**: 319–320, Jan. 1941.

SETH-SMITH, D. About ducks. Avic. Mag., (5) **6**: 147–150, 1941.

SLIPP, JOHN W. Breeding of the Shoveller in western Washington. The Murrelet, **22**: 32–35, fig., Sept. 15, 1941.

SLIPP, JOHN W. The California Shrike in the northwest coastal belt. Condor, **43**: 243–245, Sept. 18, 1941.—Adds two unpublished records to the few already known.

STAGES, KENNETH E. Shrike feeding on a cave bat. Condor, **43**: 197, July 15, 1941.—A Loggerhead Shrike captures *Myotis velifer* twenty feet within a mine tunnel.

STAHL, JOHANN FRIEDRICH. Zuverlässiger Bericht von dem Pyrohl Goldamsel. Ornith. Monatsber., **49**: 39–42, Apl. 15, 1941.

STANFORD, J. K. The Vernay-Cutting Expedition to northern Burma.—Part IV. With notes on the collection by Dr. Ernst Mayr. Ibis, (14) **5**: 353–378, July 1941. —First Burma record for crossbills. Describes *Delichon nipalensis cuttingi*, *Hirundo striolata stanfordi* and *H. s. formosae* (from Formosa), *Alauda arvensis vernayi*.

STEPHENS, ALBERT B. Fork-tailed Petrels seen from Marina, California. The Gull (San Francisco), **23**: 35, Oct. 1941.

STEPHENS, LAURA A. Ravens in San Francisco. The Gull (San Francisco), **23**: 27, Aug. 1941.

STEVENS, R. The Red-breasted Goose (*Branta ruficollis*). Avic. Mag., (5) **6**: 113–115, col. pl., 1941.

STIRLING, J. F., AND ROBINSON, G. K. Breeding of the Fulmar Petrel in Cumberland. British Birds, **35**: 61, Aug. 1, 1941.—First record of definite breeding on the west side of England or Wales.

STOLL, MRS. O. A. A winter Ruby-crowned Kinglet. Jack-pine Warbler, **19**: 94, July 1941.—A bird came regularly to a feeding station at Gull Lake, Michigan, from late December till into February.

STONER, DAYTON. Homing instinct in the Bank Swallow. Bird-banding, **12**: 104–108, July 1941.—Does not become pronounced until the individual has once nested. The breeding members of a colony probably remain more or less together in the non-breeding period.

STRESEMANN, ERWIN. Der Fall der Schleswiger Truthähne. Ornith. Monatsber., **49**: 33–39, Apl. 15, 1941.—Swiss record rests on uncertain basis.

SUTTON, GEORGE MIKSCH. The plumages and molts of the young Eastern Whip-poorwill. Occas. Papers Mus. Zool., Univ. Michigan, no. 446: 6 pp., pl. 1, Aug. 7, 1941.—A description of the natal, juvenal and first-winter plumages, and their progressive development.

SUTTON, GEORGE MIKSCH. The juvenal plumage and postjuvenal molt of the Vesper Sparrow. Occas. Papers Mus. Zool., Univ. Michigan, no. 445: 10 pp., pl. Aug. 6, 1941.—On the progress and duration of these molts.

SWEETNAM, J. E. War-time aviculture: a suggestion. Avic. Mag., (5) **6**: 119–122, 1941.

TEST, FREDERICK H. An afternoon with California Condors. Indiana Audubon Year Book, **19**: 24–28, 1941.

TEST, L. A. Some birds of a California citrus ranch. Indiana Audubon Year Book, **19**: 7–12, 1941.

THOMSON, A. LANDSBOROUGH. Some remarks on the present status of ornithology. Bull. British Ornith. Club, **61**: 53–59, June 20, 1941.—"Ornithology has much to contribute in many aspects of biological science."

TOUT, WILSON. A survey of summer birds at Wellfleet Recreation Grounds, Wellfleet, Nebr., June 7 to 15, 1941. Lincoln County Tribune (North Platte, Nebr.), 1941, 10 pp.—A list of 49 species observed.

TROTT, A. C. Notes on birds seen and collected at Jedda, 1937–1940. Ibis, (14) **5**: 396–402, July 1941.

TUBANGUI, MARCOS A., AND MASILUNGAN, VICTORIA A. Trematode parasites of Philippine vertebrates, IX: Flukes from the Domestic Fowl and other birds. Philippine Journ. Sci., **75**: 121–140, 3 pls., June 1941.

TUCKER, B. W. Further data on nest-sanitation. British Birds, **35**: 66–72, 3 figs., Sept. 1, 1941.—With list of birds in relation to removal of feces.

TYSER, JESSIE. The effect of war conditions and hard winter on a waterfowl collection in Sutherland. Avic. Mag., (5) **6**: 144–146, 1941.

VAN ROSSEM, A. J. A race of the Poor-will from Sonora. Condor, **43**: 247, Sept. 18, 1941.—*Phalaenoptilus nuttallii adustus* is described from Pima Co., Arizona.

VAN ROSSEM, A. J. The Thick-billed Kingbird of northern Sonora. Condor, **43**: 249–250, Sept. 18, 1941.—Describes as a new race, *Tyrannus crassirostris sequestratus* from Rancho La Arizona, Sonora.

VAN ROSSEM, A. J. A race of the Blue-hooded Euphonia from Sonora. Occas. Papers Mus. Zool., Univ. Michigan, no. 449, 2 pp., Oct. 9, 1941.—Describes *Tan[illegible]gra elegantissima viscivora* from extreme southeastern Sonora.

VAN TYNE, JOSSELYN, AND TRAUTMAN, MILTON B. New birds from Yucatan. Occas. Papers Mus. Zool., Univ. Michigan, no. 439, 11 pp., July 1, 1941.—New

races are: *Colinus nigrogularis persiccus* and *C. n. caboli*, *Sturnella magna griscomi*, and *Ramphocaenus rufiventris ardelo*, all from the region of Progreso and Chichen-Itza.

WALKINSHAW, LAWRENCE H. Lincoln's Sparrow in the Lower Peninsula of Michigan in summer. Jack-pine Warbler, **19:** 69–71, fig., July 1941.—Nesting as far back at least as 1935.

WEBSTER, J. DAN. Feeding habits of the Black Oyster-catcher. Condor, **43:** 175–180, July 15, 1941.—About 30 per cent of the food is the limpet, *Acmaea digitalis*, while 13 per cent consists of *A. scutum;* the rest is mainly *Mytilus* of two species.

WEBSTER, J. DAN. The breeding of the Black Oyster-catcher. Wilson Bull., **53:** 141–156, 6 figs., Sept. 1941.—Incubation period is usually 27 days. Both sexes incubate, changing places at each low tide.

WHARRAM, H. V. Pymatuning. Oölogist, **58:** 79–81, July 1941.

WHISTLER, HUGH. Some recently described birds from India. Ibis, (14) **5:** 463–465, July 1941.—Pertinent comment on certain supposed new races.

WILLIAMS, LAIDLAW. The status and preservation of the White-tailed Kite in California. The Gull (San Francisco), **22:** 29–32, Aug. 1940.

WILSON, HAROLD B. Wisconsin bird banding for 1940. Passenger Pigeon (Madison, Wisc.), **3:** 55–57, June 1941.

YAKIMOFF, V. L. Coccidios das aves no União Sovetica. Arquivos Inst. Biol. São Paulo, **11:** 607–620, 1940.—Mallophaga from U. S. S. R.

YEALLAND, JOHN. Some European sea-ducks. Avic. Mag., (5) **6:** 123–131, 1941.—Behavior in captivity.

YEATES, G. K. Some breeding-habits of the Black-winged Stilt. British Birds, **35:** 42–46, 2 figs., Aug. 1, 1941.

NOTES AND NEWS

Snowy Owl Migration

Southern Canada and New England are experiencing a migration of Snowy Owls this year. The large number of records thus far received, especially from Maine, seems to indicate that it may rival the great invasion of 1926–27. It is desirable to record these cyclic invasions but to do so requires a great number of widely separated reports to determine the extent and range of the migration. Your cooperation is earnestly solicited. Taxidermy shops usually are a source of information concerning owls that would not otherwise be reported. Please send records of the owls seen or killed to Alfred O. Gross, Bowdoin College, Brunswick, Maine, who is compiling the records of this migration.

A Generous Gift

'The Auk' extends its thanks to Dr. George Miksch Sutton, for having raised funds to cover the cost of the colored plate in this issue. Under present conditions the Council of the A. O. U. has voted not to publish colored plates unless these are donated, since the expense is prohibitive.

Ten-year Index to 'The Auk'

The Ten-year Index to 'The Auk' for the years 1931–40 has been prepared by Mr. George Willett. It is hoped that publication may proceed at once so that the volume may be ready by spring. See notice by the Treasurer on advertising pages. The work has been carefully and thoroughly done and affords a ready means of finding all matter published in the journal during that period concerning many species of birds.

The Future of the A. O. U.

In the fifty-nine years since its founding in 1883, the American Ornithologists' Union has stood in the forefront among scientific organizations of this country. By its action and encouragement the scientific study of birds has been actively furthered, their economic value emphasized and their protection developed. The Union has published its quarterly journal 'The Auk' throughout this period for the diffusion of knowledge in ornithology, has prepared and published 'Check-lists' of the birds north of Mexico and has constantly striven to promote the scientific and popular interest in birds that has proved so effective for human benefit. Its modest income is still too small to serve these interests adequately. An endowment fund of at least $50,000 should be raised to carry on its work. These needs are briefly set forth in a modest brochure mailed in December to all members of the Union. Subscriptions or bequests are urgently asked of all who are able to make them for this purpose, that we may commence building up an adequate endowment for future work.—G. M. Allen.

OBITUARIES

WALTER WILLIS GRANGER, an Honorary Life Associate of the American Ornithologists' Union, died from coronary thrombosis, at Lusk, Wyoming, September 6, 1941, in his 69th year. He was the son of Charles H. and Ada Byron (Haynes) Granger and was born at Middletown Springs, Vermont, November 7, 1872. His education was obtained in elementary schools and the Rutland High School. At the age of 60 he received the honorary degree of D.Sc. from Middlebury College.

In 1890, he joined the staff of the American Museum of Natural History as assistant in taxidermy, and later served as field collector in geology, assistant and associate curator until 1927, when he became curator of fossil mammals. During the Museum's Central Asiatic Expeditions from 1921 to 1931, as paleontologist, he was associated with Dr. Roy Chapman Andrews and was second in command of the parties exploring the Gobi Desert in Mongolia. Here one of his notable achievements was the discovery of fossil eggs of dinosaurs.

In 1891, Granger was elected an Associate of the A. O. U. and forty years later was made an Honorary Life Associate. His publications were many, chiefly in the field of paleontology. One of special ornithological interest appeared under the joint authorship of W. D. Matthew and Granger in 1917 and contained a description of 'The Skeleton of *Diatryma*, a Gigantic Bird from the Lower Eocene of Wyoming.'

In addition to membership in the Union, Granger was a member of the Explorers' Club of New York, of which he was president from 1935 to 1937, the Linnaean Society of New York, Sigma Xi, and the Paleontological Society of America.—T. S. PALMER.

ALEXANDER HAMILTON PHILLIPS, an Honorary Life Associate of the American Ornithologists' Union, died in Princeton, New Jersey, January 20, 1937. He was born in Lawrenceville, New Jersey, May 15, 1866, the son of John Feaster and Hannah Warne Phillips. He graduated from Princeton University in 1887 with the degree of B.S. and in 1899 received the degree of Sc.D. Shortly after graduation he served as assistant in biology in the University, 1888–89, demonstrator in the following year, and instructor in mineralogy and biology 1892–93. From this time on, his interest was centered on mineralogy and from 1893 to 1898 he was instructor in mineralogy, then assistant professor, full professor in 1903 and later was also head of the department of geology.

In the meantime Phillips maintained his interest in biology. In 1891, he was elected an Associate of the A. O. U. and after completing forty years' membership, was made an Honorary Life Associate. In 1919, he was appointed vice-president of the State Board of Fish and Game Commissioners. He also held local public offices, serving as member of the City Council of Princeton from 1906 to 1911 and as mayor from 1911 to 1916.

Professor Phillips was a Fellow of the American Association for the Advancement of Science, the Geological Society of America, and the Mineralogical Society of America and a member of the American Chemical Society and Society of American Naturalists. His publications include a textbook and numerous papers on mineralogy.—T. S. PALMER.

IRA EUGENE CUTLER, an Associate of the American Ornithologists' Union for nearly ten years, died at Denver, Colorado, May 25, 1936, in his 73rd year. He was a son of Frederick and Georgia Frances (Stead) Cutler and was born at Putnam, Connecticut, October 8, 1863. He received the degree of B.S. from Albion College, Michigan, in 1893, studied at the University of Chicago, and subsequently received the degrees of A.M. from the University of Denver in 1906, and LL.D. from his alma mater in 1919. In 1884, he married Miss Amelia Perkins of Norway, Michigan, and the next year entered upon his life work as a teacher in which he was engaged for over forty years. He served as teacher of science at Menominee, Michigan, from 1895 to 1897, was superintendent of schools at Crystal Falls, Minnesota, from 1897 to 1898, and then joined the faculty of the University of Denver, where he remained the rest of his life serving as professor of zoology in his later years.

Dr. Cutler had wide scientific interests and was active in the fields of botany, geology and zoology. In botany he developed many promising hybrids of Indian corn and was said to have had the largest botanical garden in the Middle West. In geology he worked especially in the Florissant district in Colorado. He was elected an Associate of the A. O. U. in 1926 and was also a member of several other scientific organizations, including the American Genetic Association, the American Association for the Advancement of Science, the Colorado-Wyoming Academy of Science, the American Society of Mammalogists and the Cooper Ornithological Club.—T. S. PALMER.

JAMES CHASE HAMBLETON, an Associate of the American Ornithologists' Union, elected in 1935, died at Columbus, Ohio, July 6, 1938, in the 75th year of his age. He was born in Madison County, Ohio, November 12, 1863, attended elementary schools and graduated from Wooster College. Later he received the degrees of B.S. from Macalester College in St. Paul, Minnesota, and M.S. from Ohio State University. In 1890, at the age of 27, he left his native State to spend ten years in Chile, where he taught five years in a boys' private school in Santiago and later accepted a professorship in a government school, Liceo of Ancud on the Island of Chiloë. On December 25, 1891, he married Miss Sara Paulsen, a college graduate of Santiago. While in Chile he was one of the leaders on an expedition of the Boundary Commission to fix the boundary between Chile and Argentina. He proved that one of the lakes near the boundary drained into the Pacific Ocean and entitled Chile to extend its boundary which followed the crest of the southern Andes back to the lakes and thus maintain its claim to additional territory.

He returned from Chile in 1900 and took up teaching in Columbus. For sixteen years he taught Spanish and science in East High School, was made Supervisor of Nature Study in elementary schools and organized school war gardens during the World War. He served seven years as Principal of Trades High School and then became Principal of the Mound St. Junior High School.

Hambleton conducted many field trips in Franklin County and made a collection of several thousand insects for the Museum of the State Archeological and Historical Society. He was active in Boy Scout work and in addition to his membership in the A. O. U., he was a charter member of the Wheaton Club, a Columbus group of field naturalists, a charter member and past president of the Columbus Audubon Society, and a member of the Ohio Academy of Science.—T. S. PALMER.

EDWIN CLARK KENT, an Associate of the American Ornithologists' Union, elected in 1907, died at Tuxedo Park, New York, July 11, 1938, at the age of 82. He was the son of James and Sarah Irving Clark Kent, the latter a grandniece of Washington Irving. The Kents first settled in New England in 1640 and an ancestor of the present generation, Rev. Elisha Kent, brought the family to Dutchess County, New York, where they settled near Brewster. Edwin was born at Fishkill Landing (now Beacon), New York, in 1856, and graduated from Columbia University in the class of 1876. He was admitted to the bar in 1879 and later became a member of the firm of Tillotson and Kent which specialized in New York real estate.

In 1886, Kent moved to Tuxedo Park which became his future home. Among his publications was a local history entitled 'The Story of Tuxedo Park' which appeared about 1936. He was much interested in fishing and hunting and was the author of 'The Isle of Long Ago,' a treatise on early sports of America.—T. S. PALMER.

MRS. MARY HARRIMAN RUMSEY (MRS. CHARLES CARY RUMSEY), a Life Associate of the American Ornithologists' Union, died at Washington, D. C., December 18, 1934, from injuries received while fox hunting in Virginia. She was born in New York City, November 17, 1881, the eldest daughter of Edward Henry and Mary Williamson Averell Harriman. Her education was received at Brearly School and Barnard College, from which she graduated in 1905 with the degree of A.B. During her college course she specialized in biology and sociology and became so much interested in social service that it influenced her later activities to a considerable extent.

In 1899, she was a member of the Harriman Alaska Expedition and in the same year was elected an Associate of the Union. Her membership lapsed in 1910 but in 1925 she was elected a Life Associate.

In 1901, she founded the New York Junior League which fostered neighborhood settlement work and during the World War she served in many defense and welfare organizations. In 1910, she married the sculptor Charles Cary Rumsey, who died in 1922. One of his principal works was an equestrian statue of Francisco Pizarro, the conqueror of Peru. Mrs. Rumsey presented one of these statues to Lima, Peru, and another to the city of Trujillo, Spain, Pizarro's birthplace. For the latter gift she was decorated in 1930, by the Spanish government, with the cross of the Order of Isabella. In 1933, she was appointed by President Roosevelt as chairman of the Consumers' Advisory Board of the National Recovery Administration and adviser on consumers' problems in the National Emergency Council.

It is not surprising that with her personal charm, energy, and initiative, coupled with ample means, she was able to gain a place in the list of the most distinguished women of the United States.—T. S. PALMER.

THE FIFTY-NINTH STATED MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION

BY LAWRENCE E. HICKS

THE first meeting to be held in the Denver area took place September 1–6, 1941. Headquarters were at the Hotel Cosmopolitan in Denver and most of the business sessions were held there. The public sessions were held in the splendid auditorium of the Colorado Museum of Natural History.

Business Sessions.—The meetings on Monday, September 1, included two sessions of the Council, a meeting of the Fellows at 4 p. m., and a meeting of the Fellows and Members at 8 p. m. The evening business session was attended by 16 Fellows and 19 Members—a total of 35 present.

There were elected three Fellows, two Corresponding Fellows, two Honorary Fellows, 10 Members and 256 Associates. On October 1, 1941, vacancies in the various membership classes were as follows: Fellows, 0; Honorary Fellows, 2; Corresponding Fellows, 20; Members, 13.

The Treasurer's preliminary report was accepted and the meeting authorized the Finance Committee (acting without the Treasurer) to review and approve the final audited report which would be available at the end of the current fiscal year (September 30). This final report (approved on November 10) appears farther on.

The Investing Trustees' preliminary report was accepted and the Finance Committee was authorized to review and approve the final audited report which would be available as of September 30, the end of the current fiscal year. This final report, approved on November 10, 1941, showed that the Endowment Fund had a value of $30,784.50, and that it was in excellent condition.

The Secretary's report, revised to September 30, 1941, indicated that the Union's membership was distributed as follows: Patrons, 3; Fellows, 50; Emeritus Fellows, 2; Honorary Fellows, 23; Corresponding Fellows, 80; Members, 137; Associates, 1426; Associates-elect, 3. Total excluding duplications, 1722. There were in addition, 187 subscribers. This represents a small decrease of eighteen members, compared with the previous year. Due to world conditions, particularly affecting Canadian and foreign subscribers, the number of subscribers has decreased from 201 to 187. Twenty-five resignations had been accepted during the year and 256 Associates elected. Roll call was held for the 29 members deceased since the last meet-

ing: 1 Fellow Emeritus, 1 Honorary Fellow, 1 Corresponding Fellow, 1 Member, and 25 Associates.

The retiring members of the Council (W. L. McAtee, Robert T. Moore, and John T. Zimmer) were replaced for a three-year term by Frederick C. Lincoln, Hoyes Lloyd, and George M. Sutton. All of the other officers were re-elected.

Two new amendments to the By-Laws were passed and laid on the table for final consideration at the 1942 meeting in Philadelphia. The first abolishes the class of Corresponding Fellows by combining it with the class of Honorary Fellows so that all Foreign Fellows will receive 'The Auk.' Since these two classes previously had a combined membership limit of 125, the new membership limit for the class of Honorary Fellows now becomes 125 and Honorary Fellows may be elected from any country except the United States and Canada. The second proposal permits Associates to recommend to the Council through the Secretary the names of candidates for Associate membership. Final and favorable action was taken on a new amendment which makes all publications issued during the *six calendar years* preceding a given A. O. U. meeting, eligible for Brewster Medal awards.

The Council empowered the Finance Committee and the Publications Committee to proceed with the publication of the 1931–40 Ten-year Index of 'The Auk' and empowered the Finance Committee, in conference with the Publications and Check-list Committees, to arrange for prompt publication of the 5th edition of the 'A. O. U. Check-list of North American Birds,' as soon as the manuscript is completed.

The Council authorized the Endowment Committee to proceed with its drive for increased endowment funds for the A. O. U. and voted $200 for its campaign.

The Council voted to limit each edition of 'The Auk' to 300 copies in excess of current needs and to use no colored plates in 'The Auk' in 1942 unless contributed.

The 1941 award of the Brewster Medal was made to the late Donald R. Dickey and to A. J. van Rossem in recognition of their volume on 'Birds of El Salvador' which was published by the Field Museum in 1938.

The present Trustees (George Stuart, 3rd, and C. H. Riker) were re-elected and Stephen S. Gregory, Jr., was elected as the third trustee to fill the vacancy created through the death of Edward Norris. Also, George Willett was re-elected as Editor of the Ten-year Index of 'The Auk.'

The Union voted to accept the report of the Committee on Bird Protection (Victor Cahalane, Clarence Cottam, William Finley, and Aldo Leopold). The full report will appear in a later issue of 'The Auk.'

The Union adopted the report of the Resolutions Committee (Alden H. Miller, George M. Sutton, and J. Van Tyne). This expressed appreciation to the following for their contributions to the 1941 meeting: the Local Committee (Alfred M. Bailey, Chairman, Fred G. Brandenburg, Edwin R. Kalmbach, Robert J. Niedrach, Horace G. Smith, and Charles C. Sperry); the officers of the Union; the Ladies' Entertainment Committee consisting of wives of the members of the Local Committee and Mrs. John Evans, Mrs. Lawrence C. Phipps and Mrs. Verner C. Reed; the Board of Trustees of the Colorado Museum of Natural History and particularly its President, Mr. C. H. Hanington; and to many other ornithologists of Colorado who helped in making preparations and who so hospitably cared for visitors from out of State during meetings and on the field trips to Mt. Evans and the Colorado plains.

Public meetings.—The public meetings opened on Tuesday morning with an address of welcome by C. H. Hanington, President of the Board of Trustees of the Colorado Museum of Natural History, and a response by President James P. Chapin. The program included 45 papers, four of which were read by title, and as usual covered a wide range of subjects, both popular and technical. Classified as to content, the papers covered the following subjects: life history, 12; behavior, 6; faunas, 10; ecology, 4; conservation-education or protection, 2; biography, 1; distribution and migration, 10; bird-banding, 3; exploration, 8; techniques, 7; taxonomy, 3; predation, 3; disease, 2; anatomy and physiology, 2; management, 5; bird song, 2; waterfowl, 1.

Social events.—On Tuesday evening, 232 persons attended a buffet supper and an open house at the Colorado Museum of Natural History. This event afforded a welcome opportunity for visits with friends while reviewing the interesting vertebrate collections. Following this, the group retired to the auditorium where a public session with four kodachrome-film presentations attracted an audience of 657. Wednesday evening was occupied by the annual dinner at the Cosmopolitan Hotel with 173 present. The highlight of the evening was a 'review around the world' by President Chapin of prominent ornithologists and their current activities during wartime, and a special floor show with all the trimmings arranged by the Local Committee. On Tuesday, Wednesday and Thursday noons group luncheons were held in the basement of the Museum. Wednes-

day noon a group photograph was taken of the 117 members present at that time. A second public session, Thursday evening, with six kodachrome-film presentations, attracted an audience of 748.

Excursions.—Friday, September 5, 116 persons participated in an all-day field trip to the top of Mt. Evans, one of the highest scenic highways in the world (14,260 feet). Stops were made in the various 'life zones,' including Echo Lake (10,600 feet) and Summit Lake (12,740 feet). Many of the eastern visitors thoroughly enjoyed their first real contacts with high altitudes and western mountain birds. A number of ptarmigans, leucostictes and five mountain sheep, were observed. On Saturday, 54 persons participated in an all-day trip to the level prairie country east of Denver to observe Mountain Plover and other shorebirds, waterfowl and various prairie species and habitats.

THE PROGRAM

Papers are arranged in the order in which they were presented at the meeting. Starred papers were illustrated by lantern slides; those with a double star were illustrated by motion pictures.

TUESDAY MORNING

Welcome by C. H. HANINGTON, President of the Board of Trustees of the Colorado Museum of Natural History.

Response by JAMES P. CHAPIN, President, American Ornithologists' Union.

Roll Call of Fellows and Members, Reports of the Business Meeting, Announcement of the Result of Elections.

Report of the Local Committee on Arrangements. EDWIN R. KALMBACH.

1. A Study of Kirtland's Warbler. J. VAN TYNE, Museum of Zoology, University of Michigan, Ann Arbor, Michigan.
2. *Further News of *Afropavo*. JAMES P. CHAPIN, American Museum of Natural History, New York City.
3. *Bald Eagle Distribution along the Lower Mississippi River. ALBERT F. GANIER, Nashville, Tennessee.
4. Birds of the Gomez Farias Region of Southwestern Tamaulipas. A Report on the Cornell University-Carleton College Ornithological Expedition. GEORGE MIKSCH SUTTON and OLIN S. PETTINGILL, JR., Cornell University, Ithaca, New York, and Carleton College, Northfield, Minnesota.
5. Song in Female Birds. MARGARET M. NICE, Chicago, Illinois. (Read by title.)
6. In Memoriam: Joseph Grinnell. JEAN M. LINSDALE, Frances S. Hastings Natural History Reservation, Monterey, California. (Read by title.)

TUESDAY AFTERNOON

7. Density and Distribution of the Prairie Falcon in Colorado. HAROLD WEBSTER, JR., Denver, Colorado.
8. *A Review of Differentiation Centers for Birds in the Western Great Basin Region. ALDEN H. MILLER, Museum of Vertebrate Zoology, Berkeley, California.

9. *Predatory Bird Populations at Stillwater, Oklahoma. FREDERICK M. BAUMGARTNER, Oklahoma A. and M. College, Stillwater, Oklahoma.
10. *Apparatus for Coloring Wild Animals. JAMES MOFFITT, California Academy of Sciences, San Francisco, California.
11. *Display and Sexual Behavior of the Brandt's Cormorant. LAIDLAW O. WILLIAMS, Carmel, California.
12. **Wings to the North—Blue and Snow Goose Migration in Western Minnesota—16-mm. Kodachrome. RALPH A. WOOLSEY, Minnesota Department of Conservation, St. Paul, Minnesota.
13. A Cliff Swallow Colony and its Uninvited Guests. W. J. BAERG, Dept. of Entomology, University of Arkansas, Fayetteville, Arkansas. (Read by title.)

TUESDAY EVENING

14. **Color in the Southwest. ALFRED M. BAILEY, Colorado Museum of Natural History, Denver, Colorado.
15. **Horned Grebes and the Northern Red Fox. CLEVELAND P. GRANT, Covington, Kentucky.
16. **Birds of the Pacific Coast. ED N. HARRISON, Encinitas, California.
17. **Bird Magic in Mexico—The Story of the Cornell University-Carleton College Expedition—16-mm. Kodachrome. GEORGE MIKSCH SUTTON and OLIN S. PETTINGILL, JR., Cornell University, Ithaca, New York, and Carleton College, Northfield, Minnesota.

WEDNESDAY MORNING

18. More Progress in Bird-sound Recording (with phonograph records). ARTHUR A. ALLEN, Cornell University, Ithaca, New York (presented by GEORGE M. SUTTON).
19. Throat Lesions occurring in Mourning Doves. CARLTON M. HERMAN, Los Angeles Wildlife Disease Research Station, Los Angeles, California.
20. Work with Birds on the Hastings Natural History Reservation. JEAN M. LINSDALE, Frances S. Hastings Natural History Reservation, Monterey, California.
21. *The Life Equation of the Ring-necked Pheasant. LAWRENCE E. HICKS and DANIEL L. LEEDY, Ohio Wildlife Research Station, Ohio State University, Columbus, Ohio.
22. More Loss of Bird Song. W. E. SAUNDERS, London, Ontario.

WEDNESDAY AFTERNOON

23. Birds of Rocky Mountain National Park. FRED M. PACKARD, Passaic, New Jersey (read by LAWRENCE E. HICKS).
24. The Wild-bird Plumage-traffic Campaign. JOHN H. BAKER, National Audubon Society, New York City.
25. Notes on the Nest History of the Gadwall. MERRILL C. HAMMOND, Lower Souris Refuge, Upham, North Dakota.
26. *Tagging the Black-footed Albatross. LOYE MILLER, University of California at Los Angeles, Los Angeles, California (presented by ALDEN H. MILLER).
27. **The Western Grebe: a Life-history Contribution—16-mm. Kodachrome. W. F. KUBICHEK, U. S. Fish and Wildlife Service, Washington, D. C.

THURSDAY MORNING

28. *Which Subspecies of Turkey Vulture is found in Western United States? DEAN AMADON, American Museum of Natural History, New York City.
29. Specific Relations of the Yellow and Golden Warblers. JOHN W. ALDRICH, U. S. Fish and Wildlife Service, Washington, D. C.
30. The Induction of Northward Migration in the Oregon Junco in Winter. ALBERT WOLFSON, Museum of Vertebrate Zoology, Berkeley, California.
31. Southwestern Utah as a Biotic Area. WILLIAM H. BEHLE, Dept. of Biology, University of Utah, Salt Lake City, Utah.
32. How Woodlots and Fencerows Function in Bird Production. DANIEL L. LEEDY, Ohio Wildlife Research Station, Ohio State University, Columbus, Ohio.
33. **Photographing the Saw-whet Owl—16-mm. Kodachrome. FRED G. BRANDENBURG, The Colorado Museum of Natural History, Denver, Colorado.

THURSDAY AFTERNOON

34. *Bird Populations in Relation to the Composition of Vegetation. FRANK A. PITELKA, Museum of Vertebrate Zoology, Berkeley, California.
35. Behavior and Distribution of Brandt's and Double-crested Cormorants on San Francisco Bay. GEORGE A. BARTHOLOMEW, JR., Museum of Vertebrate Zoology, Berkeley, California.
36. **Wild-bird Production at Audubon Sanctuaries in 1941—16-mm. Kodachrome. JOHN H. BAKER, National Audubon Society, New York City.
37. **Notes on the Birds of the Mandel Galapagos Expedition—16-mm. Kodachrome. RUDYERD BOULTON, Field Museum of Natural History, Chicago, Illinois.
38. **Social Behavior of the Sage Grouse in the Mating Cycle—16-mm. Kodachrome. JOHN W. SCOTT, Zoology Department, University of Wyoming, Laramie, Wyoming.
39. Progress and Potential Value of the Audubon Breeding-bird Census. JOSEPH J. HICKEY and ROGER T. PETERSON, National Audubon Society, New York City. (Read by title.)

THURSDAY EVENING

40. **Ornithological Miscellany—16-mm. Kodachrome. PAUL KELLOGG, Cornell University, Ithaca, New York (presented by GEORGE M. SUTTON).
41. **Color in the High Country. ROBERT J. NIEDRACH, The Colorado Museum of Natural History, Denver, Colorado.
42. **Colorado Birds—16-mm. Kodachrome. LOWELL MILLS, Colorado Springs, Colorado.
43. **Mating of the Sharp-tailed Grouse. CLEVELAND P. GRANT, Covington, Kentucky.
44. **Let 'em Live—Colonial Bird Life on an Island of the Bowdoin Lake Refuge, Montana—16-mm. Kodachrome. W. F. KUBICHEK, U. S. Fish and Wildlife Service, Washington, D. C.
45. **Galapagos Birds. A Pictorial Record of the Lack-Venables Galapagos Expedition of the Zoological Society of London, with introductory remarks by ROBERT C. MILLER, California Academy of Sciences, San Francisco, California.

ATTENDANCE

The 1941 meeting, the first to be held in the Denver area, had a registered attendance of 116 members (all classes) and 96 visitors—a total of 212, in addition to an attendance of 657 and 748 at the two public evening sessions. The list of those present in 1941 included 18 Fellows, 24 Members and 74 Associates.

Members were present from 34 States and Provinces. One hundred and four members and 73 visitors registered from localities outside of Colorado. Exclusive of visitors the eight largest delegations were: California, 20; New York, 14; Colorado, 12; Washington, D. C., 8; Ohio, 6; Nebraska, 5; Pennsylvania, 5; and Illinois, 5.

The six members traveling the greatest distances were: Per Host, Lake Placid, Florida; Herbert Stoddard, Thomasville, Georgia; E. Milby Burton, Charleston, South Carolina; and James C. Greenway, Jr., Cambridge, Massachusetts.

CALIFORNIA, 20—*Fellows,* Alden H. Miller, Berkeley; Loye H. Miller, Los Angeles; Robert T. Moore and Adriaan J. van Rossem, Pasadena; George Willett, Los Angeles. *Members,* Laurence M. Huey, San Diego; Jean M. Linsdale, Monterey. *Associates,* Mrs. E. K. Austin, Piedmont; George A. Bartholomew, Jr., Berkeley; Walter W. Bennett, Los Angeles; Ed N. Harrison, Encinitas; Junea W. Kelly, Alameda; Robert C. Miller, James Moffitt, San Francisco; Frank A. Pitelka, Berkeley; Frances F. Roberts, Encinitas; John B. Robertson, Buena Park; Charles P. Smith, Saratoga; Laidlaw O. Williams, Carmel; Albert Wolfson, Berkeley.

COLORADO, 12—*Fellows,* Alfred M. Bailey, E. R. Kalmbach, Denver. *Associates,* Gordon Alexander, Boulder; Fred G. Brandenburg, Denver; Thompson G. Mauk, Lowell J. Mills, Colorado Springs; Johnson A. Neff, Robert J. Niedrach, Robert N. Randall, Horace G. Smith, Charles C. Sperry, Robinia C. Storrie, Denver.

FLORIDA, 1—*Associate,* Per Host, Lake Placid.

GEORGIA, 1—*Fellow,* Herbert Stoddard, Thomasville.

IDAHO, 1—*Associate,* William H. Marshall, Boise.

ILLINOIS, 5—*Members,* Rudyerd Boulton, H. B. Conover, Chicago. *Associates,* Marion Clow, Lake Forest; Karl Plath, Flora S. Richardson, Chicago.

IOWA, 1—*Associate,* Jean Laffoon, Sioux City.

KENTUCKY, 1—*Associate,* Cleveland P. Grant, Covington.

LOUISIANA, 2—*Member,* George H. Lowery, Baton Rouge. *Associate,* S. Elizabeth Hewes, New Orleans.

MAINE, 1—*Associate,* Edward F. Dana, Portland.

MASSACHUSETTS, 1—*Member,* James C. Greenway, Jr., Cambridge.

MICHIGAN, 4—*Fellow,* J. Van Tyne, Ann Arbor. *Members,* Pierce Brodkorb, Frederick N. Hamerstrom, Jr., Ann Arbor. *Associate,* Harry W. Hann, Ann Arbor.

MINNESOTA, 2—*Member,* Olin S. Pettingill, Jr., Northfield. *Associate,* Oscar Owre, Jr., Minneapolis.

MISSISSIPPI, 1—*Associate,* Merriam L. Miles, Vicksburg.

MISSOURI, 1—*Associate,* James W. Cunningham, Kansas City.

NEBRASKA, 5—*Associates,* A. M. Brookings, Hastings; Emma M. Ellsworth, Mary E. Ellsworth, Omaha; Marvin S. McMurtrey, Lincoln; R. Allyn Moser, Omaha.

NEW MEXICO, 2—*Associates,* A. E. Borell, Lawrence V. Compton, Albuquerque.

NEW YORK, 14—*Honorary Fellow,* Jean Delacour, New York City. *Fellows,* James P. Chapin, New York City; George M. Sutton, Ithaca. *Members,* Francis L. Jaques, T. Gilbert Pearson, Austin L. Rand, New York City; James Savage, Buffalo; Dayton Stoner, Albany. *Associates,* Dean Amadon, John H. Baker, Ruth Trimble Chapin, Eugene Eisenmann, New York City; Mr. and Mrs. Carll Tucker, Mt. Kisco.

NORTH DAKOTA, 1—*Associate,* Merrill C. Hammond, Upham.

OHIO, 6—*Fellow,* Lawrence E. Hicks, Columbus. *Member,* Milton B. Trautman, Put-in-Bay. *Associates,* David T. Katz, Daniel L. Leedy, Robert H. Mills, Columbus; William C. Herman, Cincinnati.

OKLAHOMA, 3—*Associates,* F. M. Baumgartner, Joseph C. Howell, Stillwater; Seth H. Low, Cherokee.

ONTARIO, 3—*Fellows,* Hoyes Lloyd, Ottawa; W. E. Saunders, London. *Member,* L. L. Snyder, Toronto.

OREGON, 2—*Fellow,* Stanley B. Jewett, Portland. *Member,* William L. Finley, Portland.

PENNSYLVANIA, 5—*Associates,* J. Frank Cassel, Wyomissing; Eleanor C. Emlen, Philadelphia; Robert W. Glenn, George B. Thorp, Pittsburgh; Dale Rudert, Saxonburg.

SOUTH CAROLINA, 1—*Associate,* E. Milby Burton, Charleston.

TENNESSEE, 1—*Member,* Albert F. Ganier, Nashville.

TEXAS, 3—*Associates,* A. R. Shearer, Mont Belview; Philip F. Allen, Amarillo; George B. Saunders, Brownsville.

UTAH, 1—*Member,* William H. Behle, Salt Lake City.

VIRGINIA, 1—*Member,* Wesley F. Kubichek, Arlington.

WASHINGTON, 1—*Associate,* Elizabeth L. Curtis, Seattle.

WASHINGTON, D. C., 8—*Fellows,* Ira N. Gabrielson, Frederick C. Lincoln. *Members,* John W. Aldrich, Clarence Cottam, Herbert G. Deignan. *Associates,* Charles H. M. Barrett, Hartley H. T. Jackson, Robert C. McClanahan.

WEST VIRGINIA, 1—*Associate,* George H. Breiding, Wheeling.

WISCONSIN, 2—*Associates,* Walter J. Mueller, Elizabeth A. Oehlenschlaeger, Milwaukee.

WYOMING, 2—*Member,* O. J. Murie, Jackson. *Associate,* John W. Scott, Laramie.

ELECTION OF OFFICERS

The election of officers for 1942 resulted as follows: *President,* James P. Chapin; *Vice-Presidents,* George Willett and J. L. Peters; *Secretary,* Lawrence E. Hicks; *Treasurer,* Rudyerd Boulton. *Members of the Council* (in addition to officers and ex-presidents), for three years: Hoyes Lloyd, George M. Sutton and Frederick C. Lincoln.

The Council elected Glover M. Allen, Editor of 'The Auk'; Rudyerd Boulton, Business Manager; George H. Stuart, 3rd, C. H. Riker and Stephen S. Gregory, Jr., Trustees; and J. P. Chapin, S. S. Gregory, Jr., Rudyerd Boulton, W. L. McAtee, Lawrence E. Hicks, Boardman Conover and Ludlow Griscom, members of the Finance Committee.

ELECTION OF FELLOWS, MEMBERS AND ASSOCIATES

FELLOWS, 3—Alfred M. Bailey, Denver, Colorado; Lawrence E. Hicks, Columbus, Ohio; James A. Munro, Okanagan Landing, British Columbia.

HONORARY FELLOWS, 2—David A. Bannerman, London, England; and Rear-Admiral Hubert Lynes, Oxford, England.

CORRESPONDING FELLOWS, 2—Julian S. Huxley, London, England; Bernard W. Tucker, Oxford, England.

MEMBERS, 10—John W. Aldrich, Washington, D. C.; William H. Behle, Salt Lake City, Utah; Ian McT. Cowan, Vancouver, British Columbia; David E. Davis, Wilmette, Illinois; Philip A. DuMont, Arlington, Virginia; John T. Emlen, Davis, California; F. N. Hamerstrom, Jr., Pinckney, Michigan; Hamilton M. Laing, Comox P. O., British Columbia; Robert T. Orr, San Francisco, California; Edward S. Thomas, Columbus, Ohio.

DECEASED MEMBERS

During the year the Union lost 42 members by death: 1 Fellow Emeritus, 2 Honorary Fellows, 3 Corresponding Fellows, 1 Member and 35 Associates.

NATHAN CLIFFORD BROWN, Fellow Emeritus and Founder, died in his 85th year at Portland, Maine, March 20, 1941.

HENRY ELIOT HOWARD,[1] Honorary Fellow (1930, 1938), aged 67, died at Worcestershire, England, December 26, 1940.

DR. ANTON REICHENOW, Honorary Fellow (1884), of Hamburg, Germany, died in July 1941.

EDWIN ASHBY, Corresponding Fellow (1918), died at Adelaide, Australia, in 1941.

DR. CLAUD BUCHANAN TICEHURST,[2] Corresponding Fellow (1922), aged 60, died at Kent, England, on February 17, 1941.

EMMA LOUISA TURNER, Corresponding Fellow (1920), died at Cambridge, England, August 13, 1940.

PROFESSOR MYRON HARMON SWENK, Member (1904, 1920), died in his 58th year at Lincoln, Nebraska, July 17, 1941.

FREDERICK H. BARRETT, Associate (1939), died at Toronto, Ontario, December 3, 1939.

MRS. CHARLES C. BLOOMFIELD, Honorary Life Associate (1901), died in her 91st year at Jackson, Michigan, February 3, 1941.

MARCIA B. CLAY, Associate, died at North Bristol, Ohio, on March 11, 1941.

ALBERT ASHLEY CROSS,[3] Associate (1918), died at Huntington, Massachusetts, April 15, 1940.

MISS EMMA GERTRUDE CUMMINGS, Associate (1903), died at Brookline, Massachusetts, in 1941.

WILLIAM OTTO EMERSON, Life Associate (1916), aged 84, died at Hayward, California, December 24, 1940.

ARTHUR COPE EMLEN,[4] Associate (1921), aged 59, died at Jacksonville, Florida, January 26, 1941.

COL. ROBERT TEMPLE EMMET, Life Associate (1926), died at Schenectady, New York, October 25, 1936.

PROFESSOR MILLARD CLAYTON ERNSBERGER, Associate (1934), died in his 78th year at Ithaca, New York, January 1940.

---

[1] For obituary notice, see Auk, 58: 443, 1941.
[2] " " " " " 58: 443–444, 1941.
[3] " " " " " 58: 448, 1941.
[4] " " " " " 58: 618, 1941.

FRANK BRISBIN FOSTER, Associate (1916), aged 67, died at Broadwater Farm, Phoenixville, Pennsylvania, July 1941.

REV. EUGENE O. GOELLNER, Associate (1928), aged 43, died at Gabriels, New York, August 18, 1941.

WALTER WILLIS GRANGER, Honorary Life Associate (1891), died in his 69th year at Lusk, Wyoming, September 6, 1941.

SAMUEL HENSHAW, Associate (1924), aged 89, died at Cambridge, Massachusetts, February 5, 1941.

GEORGE EDWARD HIX, Associate (1904), died at Brooklyn, New York, November 23, 1941.

EDWARD CARLTON HOFFMAN, Associate (1928), died in his 57th year, at Cleveland, Ohio, March 18, 1941.

MRS. GERTRUDE W. HOWELLS, Associate (1935), died at Mesilla Park, New Mexico, in August 1939.

DR. E. W. JOHNS, Associate (1939), died at Albuquerque, New Mexico, in March (?), 1941.

MISS JESSIE EMMA KLOSEMAN,[5] Associate (1909), aged 65, died at Boston, Massachusetts, October 25, 1940.

MERRIAM GARRETSON LEWIS,[6] Associate (1924), died at Salem, Virginia, January 5, 1941.

DR. GLADWYN KINGSLEY NOBLE,[7] Associate (1938), aged 46, died in New York City, December 9, 1940.

EDWARD NORRIS, Associate (1916), died at Philadelphia, Pennsylvania, January 1941.

WILLARD B. PORTER, Associate (1922), died at Salem, Massachusetts, May 12, 1941.

SAMUEL ELLIOTT PERKINS, III, Associate (1923), died at Indianapolis, Indiana, January 31, 1941.

PHILIP BERNARD PHILLIP, Life Associate (1907), aged 63, died in New York City, July 11, 1941.

WILLARD BROWN PORTER, Associate (1922), died at Salem, Massachusetts, May 12, 1941.

MARCUS CHARLES RICH, Associate (1931), died in New York City, New York, November, 1941.

EUGENE ROSIER, Associate (1927), died at Geneva, Switzerland, in 1941 (?).

DR. BOYD PARKER ROTHROCK, Associate (1925), died at Harrisburg, Pennsylvania, July 29, 1939.

EDWARD ALEXANDER SIMONS, Associate (1928), died at Charleston, South Carolina, December 1939.

HUGH MCCORMICK SMITH, Honorary Life Associate, died in his 76th year at Washington, D. C., September 28, 1941.

ELLISON ADGER SMYTH, JR., Honorary Life Associate (1892), died at Salem, Virginia, in August, 1941.

EDWARD STURTEVANT, Honorary Life Associate (1896), died at Newport, Rhode Island, January 1938.

HERBERT LANDO THOWLESS, Associate (1919), aged 69, died at Newark, New Jersey, December 1940.

DR. CHARLES VETTER, Honorary Life Associate (1898), died at Grand View, Nyack, New York, on August 28, 1941.

BURTIS H. WILSON, Associate (1939), died at Chicago, Illinois, September 10, 1941.

---

[5] For obituary notice, see Auk, 58: 449, 1941.
[6] " " " " " 58: 450, 1941.
[7] " " " " " 58: 450–451, 1941.

FINANCIAL REPORT OF THE TREASURER FOR THE YEAR ENDED SEPTEMBER 30, 1941

RECEIPTS

	For Year ended Sept. 30, 1941		*For Year ended Sept. 30, 1940*	
Membership dues:				
Current year	$2,904.00		*$3,972.00*	
Previous years	58.50		*95.50*	
In advance	2,208.00		*1,368.00*	
		$5,170.50		*$5,435.50*
Subscriptions to 'The Auk':				
Associates-elect	204.00		*219.00*	
Institutions	661.70		*559.25*	
Other individuals	72.10		*76.19*	
		937.80		*854.44*
Sales of publications:				
Back numbers of 'The Auk'	401.35		*659.23*	
'Check-list,' 4th edition	20.00		*292.00*	
Miscellaneous	265.80		*345.82*	
		687.15		*1,297.05*
Contributions to:				
Publication of 'The Auk'	30.00		*141.85*	
General expense	161.39		*26.00*	
Endowment Fund	1,006.00		*50.00*	
Denver Committee's expenses	150.00		—	
		1,347.39		*217.85*
Life Membership fees	300.00		*50.00*	
		300.00		*50.00*
Income from investments:				
General Endowment Fund	669.24		*610.37*	
William Brewster Fund	347.25		*298.68*	
Ruthven Deane Fund	223.03		*184.42*	
Educational Fund	24.67		*231.88*	
Bird Protection Fund	47.56		*163.30*	
		1,311.75		*1,488.65*
Advertising income (net)	221.35		—	
		221.35		—
Total receipts for fiscal year		$9,975.94		*$9,343.49*

DISBURSEMENTS

	For Year ended Sept. 30, 1941		For Year ended Sept. 30, 1940	
Publishing and handling of 'The Auk', Manufacture and distribution				
July, 1939	$ —		$ 987.15	
October	1,081.63		1,129.16	
January	1,067.43		1,047.57	
April	1,001.15		1,130.11	
July	1,263.94		1,183.02	
		$4,414.15		$5,477.01
Editor's honorarium	600.00		600.00	
		600.00		600.00
Reserve stock of publications				
Services, postage, supplies	146.49		117.19	
Constructing storage cabinet	—		71.35	
		146.49		188.54
Purchase of back numbers of 'The Auk'	114.75		209.38	
		114.75		209.38
Total disbursements in connection with publishing and handling of 'The Auk'	5,275.39		6,474.93	
		5,275.39		6,474.93
Expenses of Treasurer & Bus. Mgr.				
Secretarial	599.75		595.05	
Office expense & supplies	161.66		180.48	
Postage & express	84.76		190.28	
Telephone & telegraph	9.44		7.62	
Furniture & fixtures	—		11.25	
Bank charges & foreign exchange	81.88		71.64	
Miscellaneous	27.15		25.46	
		964.64		1,081.78
Expenses of Secretary:				
Secretarial	55.80		42.60	
Facsimile of minute books	—		91.59	
Postage, mailing & telephone	54.73		38.21	
Printing	129.00		45.54	
Miscellaneous	19.83		—	
Office supplies	28.17		—	
		287.53		217.94
Addition to principal of General Endowment Fund	1,306.00		250.00	
		1,306.00		250.00
Disbursements from income of restricted endowment funds				
Educational Fund	72.00		—	
Bird Protection Fund	15.23		—	
Brewster Memorial Award				
Cost of medal	15.00		15.00	
Honorarium	332.25		283.68	
		434.48		298.68

Contributions				
Zoological Society of London	25.00		*25.00*	
Int. Com. on Nomenclature	10.00		*10.00*	
Local Committee, expenses	150.00		*150.00*	
		185.00		*185.00*
Total disbursements for fiscal year		$8,453.04		*$8,508.33*

RECAPITULATION

(as of September 30, 1941)

Liabilities:			
Accounts payable	$ 0.00		
Dues collected in advance	2,208.00		
Restricted Funds	382.23		
		$2,590.23	$2,590.23
Assets:			
Cash on hand	10.00		
The Northern Trust Co	2,489.42		
		2,499.42	
Accounts receivable	172.87		
Less 10% reserve	17.29		
		155.58	
			2,655.00
Net current assets			$ 64.77

A committee consisting of Messrs. Chapin, McAtee, Hicks, Gregory, Griscom, and Conover has accepted the Treasurer's Report, audited by Arthur Young and Company, on behalf of the Union.

The total circulation of Volume 58 of 'The Auk' was 1836, there being, in addition to the members of the Union who receive the journal with their membership, 41 free exchanges with other ornithological and scientific periodicals and 187 paid institutional subscribers. This total is somewhat below the circulation of last year, 1912. The difference is wholly accounted for by a drop in Canadian and foreign circulation, war conditions throughout the world having prompted many foreign subscribers and correspondents to request that the journal be held for them until conditions for its mailing are safer. The edition printed for each of the four numbers of Volume 58 of 'The Auk' was 2300.

The annual report of the Investing Trustees on the Endowment Fund as of September 30, 1941, has been accepted by the Finance Committee on behalf of the Union. The report shows the permanent funds of the Union to be invested in conservative securities with ample diversification and satisfactory yield of income. The General En-

dowment Fund shows an increase in book value over last year of $1,306.00, of which $300.00 represents Life Membership fees, the balance coming from the estate of Mrs. Witmer Stone. The value of the other four funds remains unchanged. The market value of the consolidated Endowment Fund increased from $29,721.30 to $30,784.50 during the year.

For the first time in a great many years, 'The Auk' carried general advertising. The gross income was $452.41, the expenses being as follows: printing of the advertising pages in 'The Auk' (3 issues), $119.50; promotion, $18.00; advertising and space agents' fees and commissions, $93.46. The net income was thus $221.35 as shown. It is to be hoped that this undertaking may become a steady source of income for 'The Auk.' It will, however, require the whole-hearted support of the Union's membership to achieve this result.

During the coming year the Union is faced with the expense of publishing the 1931–40 Ten-year Index to 'The Auk,' the manuscript of which has been completed by Mr. George Willett. The 5th edition of the A. O. U. 'Check-list of North American Birds' also looms ahead and while no publication date can yet be set, the manuscript, which is being prepared by a committee under the chairmanship of Dr. Alexander Wetmore, is rapidly taking form. In view of these extraordinary expenses, recurrent only at intervals of approximately ten years, it is fortunate that the Union has for the first time in a number of years a working balance instead of a deficit. The economies and restrictions recommended by the Finance Committee will continue until these two books are published and it is believed that the Union can issue them promptly without incurring any obligations.

RUDYERD BOULTON, *Treasurer and Business Manager*

Publications of the A. O. U.

BACK NUMBERS OF 'THE AUK'

The present scale of prices supersedes all others published, as of January 1, 1942. Orders will be filled in the sequence in which they are received. There may be some delay in supplying certain numbers of which the stock is limited.

Price per Volume

Year	*Price*	*Year*	*Price*	*Year*	*Price*
1884	$25.00	1903	$3.00	1922	$2.00
1885	20.00	1904	3.00	1923	2.00
1886	10.00	1905	3.00	1924	4.00
1887	5.00	1906	4.00	1925	2.00
1888	18.00	1907	4.00	1926	2.00
1889	18.00	1908	4.00	1927	2.00
1890	9.00	1909	3.00	1928	4.00
1891	4.00	1910	4.00	1929	4.00
1892	10.00	1911	9.00	1930	4.00
1893	4.00	1912	3.00	1931	2.00
1894	4.00	1913	2.00	1932	2.00
1895	4.00	1914	2.00	1933	2.00
1896	3.00	1915	2.00	1934	2.00
1897	3.00	1916	2.00	1935	2.00
1898	4.00	1917	2.00	1936	4.00
1899	3.00	1918	2.00	1937	10.00
1900	3.00	1919	3.00	1939	4.00
1901	4.00	1920	3.00	1939	4.00
1902	3.00	1921	3.00	1940	4.00

Price per Copy

All single copies are $1.00 each except the following:

Year	*Issue*	*Price*	*Year*	*Issue*	*Price*	*Year*	*Issue*	*Price*
1884	Jan.	$10.00	1886	Oct.	$10.00	1890	Oct.	$ 8.00
	April	10.00	1887	Jan.	3.00	1892	Jan.	10.00
	July	10.00	1888	Jan.	10.00	1911	July	8.00
	Oct.	4.00		Oct.	10.00	1937	April	2.00
1885	April	10.00	1889	Jan.	10.00		July	8.00
	July	8.00		July	10.00			
	Oct.	8.00						

Discounts for whole volumes purchased at one time are as follows:

6–10 volumes, 15%; 11–20 volumes, 20%; 21–30 volumes, 25%; 31–40 volumes, 30%; over 40 volumes, 35%.

For example:

1884–1940, *$277, less 35%*, $180.05
1891–1940, *$172, less 35%*, $111.80
1901–1940, *$130, less 30%*, $91.00
1921–1930, *$ 29, less 15%*, $24.65

Other series in proportion

The American Ornithologists' Union
Field Museum of Natural History
Chicago, Illinois

THE AUK

A Quarterly Journal of Ornithology

ORGAN OF THE AMERICAN ORNITHOLOGISTS' UNION

Manuscripts should be typewritten if possible. As an aid in bibliography, titles should be brief. References to literature, if few, may be inserted in parentheses at the appropriate places in the text, or listed at the end of the paper rather than in footnotes. Roman numerals and extensive tables are to be avoided. Line drawings intended for text illustrations should be in India ink; half-tones cannot be printed in the text since the paper is unsuitable. Longer articles should have a brief summary at the end. Except on request, no proofs of 'General Notes' or short communications will be submitted to authors.

Twenty-five copies of leading articles are furnished to authors free of charge. Reprints from 'General Notes,' 'Correspondence,' etc., must be ordered from the Editor when the manuscript is submitted.

All articles and communications intended for publication and all books and publications intended for review should be sent to the Editor,

DR. GLOVER M. ALLEN
Museum of Comparative Zoology
Cambridge, Mass.

Information relative to advertising, subscriptions, requests for back numbers of 'The Auk,' as well as for other publications of the Union, changes of address and remittances should be sent to the Treasurer and Business Manager. Claims for replacement of missing or defective copies of 'The Auk' will not be honored unless received by the Business Manager within six months of publication of the particular number involved.

RUDYERD BOULTON
Field Museum of Natural History
Chicago, Illinois

Nature Education and the War

The conservation of natural resources is vital to the national and international war program. The primary productive powers of our continent are dependent upon the maintenance of biological balance. There is danger that this be overlooked amid the pressing problems of direct military and industrial mobilization. In times like these, it is the duty of the Audubon Societies and the host of other organizations devoted to nature education to redouble their efforts, with increased stress on practical applications with relation to the war.

With the carrying of the war to the civilian populations of the world, the stamina of citizens in resisting the impacts of modern weapons and propaganda becomes more critical than ever. Man's need of nature increases in direct ratio with the stress of his human relations. The chief problems of war remain within ourselves. Never was there a time when it seemed more urgent that our people utilize those outlets for relaxation of tension, peace and sanity of mind, health of body and spiritual contentment which an understanding appreciation of nature affords. Promotion of such human conservation through nature education is a wartime contribution of the first order.

NATIONAL AUDUBON SOCIETY

1006 Fifth Avenue
New York, N. Y.